

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

©1974 by Computerworld, Inc.

March 6, 1974

Vol. VIII, No. 10

FOR SAMPLE COPY
WRITE TO: COMPUTERWORLD
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NEWSPAPER

NEWS IN BRIEF

Opel IBM President, Memorex to Lose Chief

It was one in and one out last week, as John R. Opel was named president of IBM, while Laurence L. Spitters resigned as president of embattled Memorex Corp. for "personal reasons."

At the same time IBM announced the merger of the management review committee and the management committee into a new corporate management committee that will be made up of Opel, Frank T. Cary, chairman and chief executive officer, and two senior vice-presidents.

Opel will also be a member of the powerful corporate office which manages IBM's day-to-day affairs, joining Cary and Gilbert E. Jones, a senior vice-president and chairman of World Trade Corp. Paul J. Kuzo, vice-president for finance and planning, has been moved up to senior vice-president and group executive for the Data Processing Product Group, Opel's former position.

Home Supermarket Shopping Plan Seen as Real Fuel-Saver

WASHINGTON, D.C. — Widespread use of in-home supermarket shopping with orders keyed in through Touch-Tone pads could save the country 600,000 barrels of gasoline daily, according to three firms that have jointly designed such a system. The presidents of Computer Shopping, Inc.; Interface Technology, Inc.; and North American Equipment, Inc. told a recent news conference here that their "electronic shopping/quick route delivery system" could slash supermarket overhead as well as consumer's fuel bills.

Their system — designed around a 30K to 50K minicomputer, audio response unit and special warehouse and delivery equipment and carrying a \$100,000 price tag — is not yet in operation, they admitted, suggesting that a nonprofit organization should be established to spread ideas and plans on such energy-saving in-house telecommunication systems.

They have asked Exxon Corp. to fund such an organization with an initial \$1,000 monthly, but "so far there is no definite response," the presidents said.

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Avoid Upgrades? Check CPE Tools

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. Most hardware upgrades are unnecessary and could be avoided by the intelligent use of computer performance evaluation (CPE) tools, according to Major Andrew Hesser, head of the U.S. Marine Corps CPE operations.

Hesser said a listing of the available tools would serve no real purpose, since "evaluation of the collected data is at least 90% of the job." But the payoff can be significant.

He described a Marine Corps installation with an over-worked IBM 360/40. In 1971 the center's staff said it had to move up to a 50. Hesser's team moved in with its hardware monitor, and came up with suggestions that allowed the 40 to cope with the admittedly increased

workload.

Today the center is still using the 40 "and a year from now, or two years from now, it'll still be using the 40," Hesser added.

CPE can be done at two levels, aimed at improving operations at either the system or the program level, he noted.

The systems level "is not necessarily more important, but it is easier to discuss," he said.

CPE wasn't really needed in earlier generations of computers, but with the growing use of multiprocessing and the economics of the 1970s it is vital. The DP staff no longer knows what's going on inside the computer and the corporate level management no longer accepts undocu-

(Continued on Page 2)

Top-Level Review Headed by Ford

Nixon Wants Privacy Shield for All

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. — Vice-President Gerald Ford has been tapped to head President Nixon's top-level review of the entire issue of personal privacy — particularly in relation to computerized data banks.

The review committee — made up entirely of administration functionaries — was told to devise "a personal shield for every American" against invasions of his privacy.

Within four months, the President asked the group to come up with a set of "direct, enforceable" measures, including executive regulations and legislative pro-

posals, that could be acted on immediately.

Nixon, whose administration has been accused of violating personal privacy through wiretapping, concentrated most of his 15-minute radio address on the issue of privacy and problems with computer data banks, and specifically told the commission not to go into the issue of wiretapping which is being studied by another administration committee.

"Many things are necessary to lead a full, free life," Nixon said, "but none of these is more important than the most basic of all individual rights, the right to privacy."

"A system that fails to respect its citi-

zens' right to privacy fails to respect the citizens themselves," he added.

"Data banks affect nearly every man, woman and child in the U.S.," Nixon said, noting that computerized data banks "scattered across the country" now contain the names of over 150 million Americans.

Often the privacy of individuals has been "seriously damaged — sometimes beyond repair" by the operation of such systems, the President said.

"Frequently," he said, "the side effect is financial damage. But it sometimes goes even further. Careers have been wrecked and reputations built up over a lifetime have been destroyed by the misuse or abuse of data technology in both private and public hands."

On the Other Hand

At the same time, however, Nixon reaffirmed that "there are, of course, many facts which modern government must know in order to function," and said that both public and private data banks were vital to the functioning of modern society.

One of the major areas for the new "top priority domestic counsel committee" to

(Continued on Page 6)

Iowa Police Still Maintaining File on 'Suspected' Criminals

By Michael D. Sorkin

Special to Computerworld

DES MOINES, Iowa — Des Moines police are again keeping a computerized list of persons they suspect — but can't prove — are guilty of crimes.

Although there have been several changes, the list is similar to records police had been keeping in 1972 [CW, Sept. 27, 1972], before a state law aimed at barring the practice was enacted.

Des Moines Police Chief Wendell Nichols testified before Iowa's Confidential Records Council recently that the new list is limited to names of persons with past histories of felony convictions, but whom police believe still are active criminals in the Des Moines area.

However, Assistant Chief Thomas Teale, the man in actual charge of the list, said later in an interview that information on people who have been arrested but not convicted is also included.

A police policy statement signed by Nichols shows that even persons with no arrest record at all may be placed on the list of suspects at the discretion of the police chief "if extraordinary circumstances, such as threatening harm to a police officer, are involved."

All Des Moines officers have standing orders to prepare "field interrogation reports" when they contact one of the 800 to 900 persons now included on the list. The field interrogation reports have been unsuccessfully attacked in court as an

unconstitutional invasion of privacy.

Myrl Levin, acting chairperson of the records council, said the agency will conduct further investigation this month into how Des Moines police are using their crime computer.

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Check This Out!

Finest supermarket clerk Sue Whitehead checks out a shopper using the store's new Univac Accuscan system in a Framingham, Mass., store. The minicomputer-controlled system is believed to be the first installed system to read the grocery industry's Universal Product Code. (story on Page 2)

In-Store Test Begins on UPC-Readable System

By Ronald A. Frank
of the CW staff

FRAMINGHAM, Mass.—Finast supermarkets has installed one of the first in-store point-of-sale systems that can read the Universal Product Code (UPC) automatically with a laser scanner.

The Univac system, called Accuscan, was installed at one checkstand to test customer reaction although many of the products stocked in the local store have not yet been marked with the UPC symbol.

For products marked with the 10-digit UPC code, the system optically scans the special label and automatically adds the cost of the item to the customer's bill by accessing a file of prices stored in the Accuscan minicomputer. For items conventionally marked, the operator enters the identifying information from a keyboard on the cash register/terminal.

Because the UPC markings do not yet appear on all items, the test checkstand will process a combination of both types of products. In the initial tests, however, Finast officials asked representative shoppers to pass through the Accuscan

system with a selected market basket containing only the UPC marked items.

Modify Prices

The test checkstand was hardwired to an "office console" from which the store manager was able to request batch totals and change prices. The console also had the capability to change prices in the mini's disk file to let the store management modify product prices based on up-to-the-minute market conditions.

The microcoded mini contained dual fixed-head disks which had a total storage "price file" expandable from 8K to 27K items.

The Accuscan test is based on a super-market system first developed by RCA and tested at Kroger's supermarket in Cincinnati during 1972-73. But the Kroger test was held before the UPC standard was adopted. According to Univac, which acquired the RCA system, the Accuscan installation marks the first time a full UPC-compatible system has been

tested in an operating environment.

The major goal of the Accuscan type of system is to reduce the "front-end" overhead in a store, according to a Univac spokesman. Based on the Kroger test, the company said checkout procedures can be "45% faster" than current manual systems using clerks at cash registers.

Among the other costs Finast hopes to eliminate will be the need for marking each supermarket item with a price. Although, according to a Finast spokesman, prices will remain at the edge of each shelf, individual items will no longer be price-marked.

"Each supermarket will have to find its own way to make the customer aware of the price on the UPC package," according to Alan Haberman, president of Finast. One customer at the Framingham store said she would be unhappy if the price of an item were not clearly marked when the item was selected.

The Accuscan system is designed to display the price of an item at a rate of

one per second or faster depending on the rate at which the checker passes the UPC-marked packages over the scanner. The cashier's hopper said the would not mind not being able to keep up with the prices when they are displayed. "I usually trust the machine not to make a mistake," she said.

Univac believes the average supermarket, like Finast, will install one Accuscan checkstand for evaluation. Assuming favorable results, it will then take "about two to five years" to automate several stores, each operating on an in-store mini. The next step would be batched on-line interaction with a mainframe at a central DP site using a polled system.

The Accuscan system can interface with Univac mainframes as well as IBM 360/370s, a Univac spokesman said. But more specialized applications will be available to supermarkets that use the Univac CPUS, he said.

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Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. © 1974 by Computerworld, Inc.

50 cents a copy; \$12 a year in U.S.; \$13 a year in Canada; all other foreign, \$36 a year. MARGARET PHELAN, circulation manager. Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160.

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Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilms, Periodicals Centre Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

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POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.

Performance Evaluation Can Avoid Upgrades

(Continued from Page 1)

mented requests for new equipment without knowing how well the current gear is being used, Hesser stated.

Not Really Difficult

Use of CPE tools is not particularly difficult, he went on, noting that he'd been with the Marines' CPE effort only three years. "Just industry training and command isn't exactly the ideal background for this kind of work, but even I've learned."

"Command" is the antithesis of the approach a CPE team should use, since the evaluation team often comes from outside the DP staff and that group may be intimidated by the monitoring operations, Hesser said.

Most large organizations should have a

CPE effort, he felt, but it needn't be large. The Marines have multiple DP installations spread over a wide geographical area, but they have only one CPE team, one hardware monitor and one software monitor. "We only got the software monitor recently, once we figured out how it might help us," Hesser noted.

Hesser had several recommendations for users planning CPE operations:

- Centralize control.
- Use only qualified personnel.
- Make careful selection of tools.
- Obtain adequate data collection and documentation.
- Standardize the documentation and reporting techniques.
- Standardize the terminology.
- Assist, don't "investigate," the user

Roadblocks Seen for Ohio Data Practices Bill

By Patrick Ward

OF THE CW STAFF
A CINCINNATI-based proposed "Code of Fair Information Practices" for Ohio (ICW. Feb. 20) will probably not get through the state legislature in 1974, State Sen. Stanley J. Aronoff (R-Cincinnati) said last week at an Association for Computing Machinery meeting here.

Aronoff said he expects passage of both his state bill and similar bills in the national level, introduced by Rep. Barry Goldwater Jr. (R-Calif.), in early 1975.

So far no one has volunteered as an opponent witness to the bill, Aronoff said. The state problem, however, said he expected the bill to be hit by a lot of amendments."

DP users have often stated they are for the system but against its cost, he added.

The bill, based on the recent Hewlett-Packard Committee report, imposes strict duties on the operators of automated personal information systems to protect individual privacy, and gives new rights to people whose records have been abused.

Failure of the operators to follow the privacy standards could result in fines, civil penalties or even imprisonment.

Dr. Alex Fraser, author of the book *Computing, Privacy and the Individual*, a professor at the University of Cincinnati, pointed out some possibly undesirable effects of the bill.

To bill's prohibition against requiring anyone to include his Social Security Number (SSN) on any form or return unless specifically required by federal law, Fraser pointed out.

"We're required by so many other organizations to use SSNs," he said, calling this provision "one of the weakest points" of the bill.

"Names are really a disaster as a means of identifying" if you don't want to be mislabeled by computer systems, Fraser remarked.

Aronoff said he expects that the SSN clause will be one of the earliest items removed from the bill.

Regarding the provision that data be eliminated from systems when the data is "stale" or no longer timely, Fraser noted that persons may change their minds after they see the effect of a deletion.

"Plenty of people have complained when we did exactly what we asked," he observed.

He could open up "a Pandora's box" with the clause requiring a DP installation to tell a person requesting it whether he is the subject of data in its files. If so, the data must be made available to him.

He said.

The experimental traffic control system, using television cameras, has the potential to shut-rush-jams here almost in half, he said.

The system will link 92 traffic lights at an Interstate M-70 corridor.

Seven television cameras strategically located on building tops throughout the city will show traffic engineers where traffic is bogging down, and the computer will be adjusted in turn to cut down the red-light time in the jammed areas.

or the DP staff.

• Develop a documented library of analysis techniques and results.

• Share experiences.

Without control and qualified personnel, the CPE effort will be erratic, will lose its potential for great good and might cause great harm, he told attendees at a recent Computerworld Caravan here.

The jobs of operators and the customer engineers from the hardware vendor must be in favor of the monitoring to make it successful. The CPE team must also be fully aware of external factors that might affect the monitoring results, he said.

Stressing the need to assist rather than investigate, Hesser quipped that the CPE team must be seen by the inspector general's office, it's from the Red Cross."

He said.

Doing what he's "the best way" to fight against mislabeled computerized information, Fraser declared.

Referring to the provision that no use of data can be made beyond the stated purposes of a system as a person signed for it, an attendee asked whether the State of Ohio could get IRS data for its state tax system. Or, "If my stockbroker wire transfers money to those that hold the rights, does he have to comply?"

Once the mechanism of the privacy bill has been established, administrative regulations will be set up to handle questions like these, Aronoff stated.

System Links Lights, Cameras, CPU Motorists to See 'More Green'

COLUMBUS, Ohio—Motorists here are expected to be seeing "more green and less red" when a new computerized monitoring system goes into operation this month, said George Butzer, a city traffic department engineer.

The experimental traffic control system, using television cameras, has the potential to shut-rush-jams here almost in half, he said.

The system will link 92 traffic lights at an Interstate M-70 corridor.

Money for the project comes from federal, state and local funds. Even though the original cost estimate has risen from \$1.75 million to \$2.6 million due to additional labor overhead, the laying of the system's underground cables is moving "on schedule," according to Butzer.

Because the wiring for the system is all underground, he sees several side benefits for the project. About 100 power lines intersections will be eliminated and as much as 60% of all overhead wiring in the downtown area will disappear. The only wire visible will be those that hold the lights over the intersection.

Also, eliminating poles will cut the city's present maintenance costs by 30% to 50%, he claimed.

Controlling the EDP Environment

ADR Announces Enhanced Autoflow II System

PRINCETON, N.J.—Applied Data Research offers a new EDP approach to IBM 360/370 DOS and OS installations. AUTOFLOW II users can extend control, improve productivity, and optimize communications throughout the entire program/system development cycle.

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sources; stabilized development procedures; and well-defined directions for all development tasks.

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- **Module Analysis Processor (MAP)**—accept and analyze over 20 different source languages to produce extensive cross-referenced listings, summary analyses, and graphic charts focusing on various aspects of program activity and logic.
- **Cross-Program Auditor (CPA)**—examines and reports upon the characteristics of any number of input programs, across program boundaries, within the context of their functional interaction as a total system.
- **Extended Text Composer (ETC)**—automates the preparation, composition, maintenance, and production of all forms of textual documentation.
- **Automated System Charter (ASC)**—

automatically generates high-level system charts and reports, thus producing a panorama of job flow throughout an entire system. (This option will be available in mid-1974.)

Advanced Development Assistance

With these new facilities, AUTOFLOW II qualifies as an advanced development tool which can substantially reduce programming time and EDP costs. ADR training aids, comprehensive documentation, and continual maintenance make AUTOFLOW II an efficient, easily used, and well-supported EDP asset. Automated error-reporting and distribution procedures expedite debugging and release of new product enhancements.

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Versatile New AID Analyzes Entire System Activity

PRINCETON, N.J.—A facility for the complete analysis of programs within an entire system further extends AUTOFLOW II's versatility.

This capability is provided by the new Cross-Program Auditor (CPA) option which permits integrated analysis of groups of program modules. CPA-generated reports can decrease the time and cost required to support applications systems, as well as increase the reliability of applications in a production status.

CPA reflects the latest advances in extending user control over ongoing system activity by providing analytical information on program inter-relationships and file organization.

Wide-Ranging Usefulness

By generating valuable analytical reports, CPA is a versatile program development aid with wide-ranging usefulness. CPA can simplify all maintenance activities, assist the data base administrator, forecast the scope of planned conversions and enhancements, monitor conformance to standards, and help in programmer training. CPA reports can also help meet the needs of auditors (either external or internal) by presenting comprehensive, highly structured reports of the often complicated interaction of programs within a system. Furthermore, its auditor can selectively search for those names, structures, locations, etc., which are particularly relevant to the specific purpose of the audit.

Automated Text Composition with AutoFlow II

PRINCETON, N.J.—Automatic preparation and production of constantly changing narrative material—ranging from design specifications to policy manuals, internal documents, and final documentation for a project—are now available with AUTOFLOW II.

A new word processing option—The Extended Text Composer (ETC)—dynamically extends AUTOFLOW II's graphic and narrative communication facilities. ETC simplifies the production and maintenance of all types of textual documentation.

Relieves Many Problems

ETC relieves the user of many common problems associated with documentation production. It allows preparation of a continuous data stream which will be composed automatically to produce pages of formatted text on a high-speed printer. Thus, all systems specifications and other narratives can be made available in hardcopy form when needed. Further, even when specifications change, all supporting documentation can be easily and immediately revised via convenient ETC updating commands.

The new word processing option handles line editing, line overflow, justification, and the proper dating of documents. ETC also provides an automatic table of contents facility, a comprehensive index generation capability. Through a facility analogous to the macro capability in Assembly languages, ETC can eliminate much repetitive data entry. ETC also enables entire sections of text to be conditionally included or omitted in the printed document.

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Teleprocessing Users Told: 'Don't Split Voice, Data Nets'

By Patrick Ward

CINCINNATI—The introduction of separate digital communication networks could impair the operation of in-house teleprocessing systems, according to Richard A. Kuehn.

Speaking at a tutorial session on communications at the Computer Caravan, the consultant said most users presently have shared voice and data facilities.



"To separate these facilities into separate networks... could result in not only higher costs but greatly impaired service to in-house users within the organization," Kuehn predicted.

Going Separate Ways

Presently most companies have a degree of interdepartmental cooperation between the data processing, teleprocessing, and telephone staffs because all are essentially sharing the same network, Kuehn said. But if each of these goes its separate way, poor economic choices could result, it would be considerably better if the responsibility for all areas of information transmission rested in a single source, he suggested.

As more new services come into operation, users should be prepared for a "warfare" between carriers, the consultant said. As conditions change it becomes even more important for users to carefully plan their data communications systems, he added.

Speaking of digital nets and other innovations for communications users, Kuehn said he would be a little cautious

before "I jumped on one of those carts of treating to watch."

"You have got a rate war coming," Kuehn explained to his

audience, "and it's going to be one of treating to watch." This means that users should stay flexible and "not get into something that is going to marry you into one method of transmission or one vendor," Kuehn advised.

Eventually, Kuehn predicted, data communications people will take over the voice side of a firm's communications as well. Both voice and data users are confronted with a large number of alternative choices in equipment and network arrangements, Kuehn pointed out.

And choices by either voice or data users can have far-reaching effects on each other, he emphasized. "The purchase of an inadequate telephone system can materially hamper long-range plans for data communications," Kuehn stressed.

Turning to projected growth in data communications users, Kuehn cited projections from a Frost and Sullivan study.

From 1974 to 1980, installed computers will go from a projected 80,000 to 163,000, or a 103% increase. At the same time, those computers with communication capability will increase 195% from a present 38,700 to a projected 114,000.

This projected increase will naturally result in increased terminal requirements, Kuehn said. However, the market for terminals is expected to increase approximately 327%. At the present time, some 48% of the computers in use are projected to be equipped with an average of 25 terminals each. By 1980, 70% of computers in use will be equipped with an average of 36 terminals.

This will increase the terminal population from a projected 3.6 million in 1974 to 4.1 million in 1980. By far, in the study, the terminal growth was the most rapid and expanding of all areas.

Several conclusions can be drawn from these projections, Kuehn said.

First, obviously the use of data terminals by the general public will become considerably more commonplace. "In my opinion, many of these terminals will take the shape of inexpensive Touch-Tone telephones provided by either the carriers or private vendors and inexpensive credit authorizing or point-of-sale terminals."

Many of these will be necessary and brought into being as presently conducted EFTS (Electronic Funds Transfer Systems) studies being conducted by the banking industry are implemented, Kuehn stated.

he is now using can replace four keypunch or key-to-tape units. But Camfield said he has not yet determined his cost savings through use of key-to-disk.

Another replacement for keypunch data entry is optical character recognition (OCR) or scanning. "This is an idea whose time has come, and it's come again and they're still monkeying around with it," Kuehn said. Scott, of American Greeting Corp., remains a "tremendous technological advance... but a very inflexible tool," he added.

Two years into the operation, however, International Reservations approached Beta Corp. to build a custom modem and dialer in a single unit. This unit reduced the cost by about \$75 per site, Milson said.

"A secondary benefit from this conversion was that more traffic could go over the same set of lines," he said. "There may be greater capacity reduced costs on the same network." Today, he said, only 12 locations out of 500 still have Bell modems.

communications with on-line systems as a subtopic, or you can talk about on-line systems with telecommunications as a subtopic, but to achieve the optimum system you need both."

Admitting that as a provider of a service he is always looking for ways to cut costs while maintaining peak efficiency, Milson discussed various ways in which his operation got around high-cost equipment and maintenance.

For instance, he has built up in-house maintenance capability, as well as the capability to repair components in-house.

Equipment selection is crucial

'Systems Approach Best'

By Molly Upton
of the CW Staff

CINCINNATI—"Use the systems approach to find out what can be done to make your equipment work," Scott Leseberg of American Greeting Corp. advised attendees at a Computer Caravan workshop on optical character recognition here last week.

One has to investigate all ingredients of the procedure involved with OCR processing of a turnaround document such as a reorder card, he said.

On being an OCR user he said, "Once you're there you begin to find out what you have to do to complement the machine." American Greeting uses an IBM 1287, which Leseberg described as something of a Rube Goldberg device. It met AG's requirements that the document be readable by older filters and customers can scan multiple lines in a single pass.

Conversion is the main problem, he said. "You've got to make sure you're ready to make the system go. You must make sure you're planned for contingencies," he explained.

But with the new system came a solution to a former problem. The punch cards used previously were being returned in the classical folded, spindled and mutilated state. AG designed a smaller document which doesn't protrude as much in the packing boxes and which survives the round trip out to the store, where it serves as a reorder card.

With some thought as to keeping the best features of the punch card system and improving the capabilities of the OCR system, AG now reads up to 400,000 documents/day.

As a visual guide to help clerks distinguish between documents comprising different shipments, the last two lines of documents are printed with a row of X's on the perforation. When assembled, these mark a dark line for the clerk, replacing the old reverse corner cut used with punched cards.

American Greeting wanted no undetected errors. Leseberg said he found that vendors don't distinguish between detected and undetected errors when representing the reliability of their products.

The 1287, he said, had a tendency to miss an error if it occurred late in the scan. So AG inserted several check digits throughout the line, which has cut down the final error rate to two-tenths of 1%.

Going on the business principle that it is better to send the customer (store) something rather than nothing, AG automatically sends out one unit of an item if there is trouble distinguishing the quantity requested.

The document is designed so the store clerk making the order can change his mind. The document is sent to the store with a preprinted quantity number.

The clerk can cross this out and mark in the separate field whether he wants one, two, three or four of the item. When the regular order quantity digit is not readable, the 1287 scans the other field, and orders that preprinted number.

Bob Goldstein, John Sherwood, William Camfield and Scott Leseberg answer questions on source data automation.



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However, OCR is an apt tool for his applications where 300,000 to 400,000 documents are handled per day, Leseberg said.

When the volume of punch cards passed the 100,000-a-day mark, and it became apparent that keypunching was going to be a very expensive way to handle source data, his firm decided it was time to try something else, Leseberg related.

Going to OCR can be rewarding if the conditions are right and you're ready to do your homework," Leseberg concluded.

A need for greater reliability in the data that 22 remote sites were sending via teletypes to a central site led Mead Corp.'s containers division to intelligent terminals, according to John Sherwood, manager of systems

Keypunching Comes In for Its Share of Lumps

By a CW Staff Writer

CINCINNATI—"We decided to look for a better system one day after we picked up 12,000 cards from a rainy street in Indianapolis," William E. Camfield of the Indiana Marion County Department of Public Works told a Computer Caravan panel here on "Source Data Automation Today."

Camfield's decision three years ago took him from keypunching cards to key-to-tape and then to key-to-disk. Camfield "saw the light" after dropping the cards while crossing the

street.

"Each time we've changed we've bettered our system," he told his audience.

Keypunchers were the "steam engines of data entry," Camfield observed, but they have the disadvantages of needing a huge staff, have slow turnaround, involve pervasive mistakes and difficulty in correcting them and have a need for volumes of paper of all sorts, he stated.

Beyond this, they required heavy use of CPU time, he added.

The three of the key-to-disk units—

Custom Modems Aid Reservations Net

By Tom Wiseman

WASHINGTON, D.C.—Large hotel chains, such as Sheraton, Ramada and Hilton, can afford their own on-line, computerized teleprocessing systems, but the smaller chains simply cannot afford the cost.

Thus, said Daniel E. Milton, vice-president, International Reservations, is where his operation comes into the picture—a reservation network which serves hotels and car rental agencies.

Milton described his installation during a Caravan workshop on on-line systems here, noting that "you can talk about tele-

communications with on-line systems as a subtopic, or you can talk about on-line systems with telecommunications as a subtopic, but to achieve the optimum system you need both."

Admitting that as a provider of a service he is always looking for ways to cut costs while maintaining peak efficiency, Milton discussed various ways in which his operation got around high-cost equipment and maintenance.

For instance, he has built up in-house maintenance capability, as well as the capability to repair components in-house.

Equipment selection is crucial



Bob Goldstein, John Sherwood, William Camfield and Scott Leseberg answer questions on source data automation.

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Police Develop Some New Beats

By Marvin Smalheiser
CW West Coast Bureau

SAN JOSE, Calif. — The police department here is implementing an experimental system designed to improve neighborhood relations and to help find solutions to crimes.

Drawing on a data base created from service calls, census information, assessor's information and crime records, non-computer personnel use a CRT to assign men to emergency calls or to make management decisions.

Deputy Chief William H. McKenzie, head of the police Field Operations Bureau, said the system also equalizes work loads, establishes beats conforming to natural boundaries and ensures that seven districts set up to supervise the beats meet the same criteria as the beats themselves.

The Geo-Data Analysis and Display System is expected to go on-line about June 1, according to Lt. Robert Bradshaw, who works in research and development for the San Jose Police Department.

The system now employs an IBM 2250 CRT terminal tied into an IBM 360/195 at IBM's San Jose Research Laboratory, where it was developed.

Later it will be connected to an IBM 370/155 when the operation is tied into the Santa Clara County Center for Urban Analysis.

Bradshaw said the system will create 40 beat areas over the 143 square miles in San Jose, using 263 basic building blocks.

This will enable the department to assign a beat officer to a service call on his beat most of the time.

In the past, 70% of the calls had to be answered by police officers from outside the beat because of the patterns in which calls came in.

Bradshaw said the system can be used easily by middle management. It takes about eight hours of familiarization training.

Non-computer people, he said, can directly formulate questions and interact with the data, eliminating the need for intermediate programmers or systems analysts.

When it is operational, some 60 persons in middle management will use the system.

The computer programs were designed by IBM.



Lt. Robert Bradshaw of the San Jose Police Department points out a key area shown on the screen of an IBM 2250 CRT.

Also included in the system is a language that can be used by non-programmers to create, revise and update maps; to display, compare and merge sections of maps; and to call up appropriate information relating to specific geographic areas.

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Send requests for DUCS VI to C. F. S., License agent agreements along with detailed information will be sent by return mail. Inquiries may be directed to Mr. Richard K. Goren.



C.F.S.
INCORPORATED

Despite New Law Iowa Police Still Have 'Suspected' File

(Continued from Page 1)

At the council's hearing, State Rep. Arthur Smael Jr. asked how police really know that someone they place on the list is actively engaged in criminal activity.

John Jones, head of the police research division, said officers base their conclusions on "investigations which are going on at the present time and court cases in which the suspect's name turns up."

That is the same procedure police were following two years ago when it was discovered they were maintaining a secret list of persons they labeled as "known criminals," although the individuals involved may never have been convicted of any crime.

After the original list was discovered, the Iowa Legislature enacted a law forbidding police from keeping unverified intelligence data in their crime computers.

The law bars police from keeping information about persons merely suspected of criminal activity in computers; only factual arrest and conviction information may be computerized.

Violations are punishable by up to three years' imprisonment and a fine of up to \$5,000.

Teale said after passage of the

law, police removed the names of a dozen persons who had no arrest records from the file of "known criminals."

The department also stopped referring to the remaining persons on the list as "known criminals," Teale said. In addition, the new file is not called an intelligence file, but is called a criminal history file. "We are in full compliance with the law," Teale asserted.

'Real Question'

"You have to admire their cleverness," Iowa Public Safety Commissioner Charles Larson said of the new list. Larson, a member of the records council, said the file may be technically legal, because it contains only arrest and conviction data, but "there is a real question as to whether this could be considered

an intelligence file."

Rep. Smael pointed out that although the Des Moines computer contains only criminal history records - as permitted by law - it contains only records of persons police suspect are now active criminals. Other criminal history records are maintained in non-computerized form.

Therefore, "the question is whether the fact that they're more strict than the law makes them be a violation of the law," Smael said.

Assistant Chief Billy Wallace argued that police need to maintain computerized data on suspected criminals "because you know and I know that there are people walking around out there who are guilty but have never been convicted." Wallace said prohibiting the practice would hamper law enforcement.

Board to Design 'Shield'

(Continued from Page 1)

look into would be "procedures which would permit citizens to inspect and correct information held by public and private institutions," the President said.

In addition, he asked the group to develop "ways that we can safeguard personal information

against improper alteration or disclosure.

On a broader basis, he asked the group to study "how the federal government collects information on people and how it is used" while on a narrower ground he asked it to recommend "regulations of the use and dissemination of mailing lists."

The new group is made up of the attorney general, five other cabinet members and four other top administration officials.

Computers Sit on Fences

SAN ANTONIO, Texas - Police here are using computers to help sort a miscellaneous collection of televisions, business machines, weapons and other items seized in a series of raids against suspected "fences."

The computers are being used to match serial numbers on the recovered merchandise (valued at approximately \$25,000), with those of items reported stolen.

Computer Accused in Death?

BURLINGAME, Calif. - Was the computer an unknowing accessory to a recent rape/murder here? Could the death have been prevented if a computer check had given the needed information?

Those are the questions being asked here in connection with the death of Liana Hughes.

Hughes' body was found inside her camper which had been parked in a lot half a block from the police station for six days, according to the local newspaper reports.

A neighborhood resident reported the vehicle, but a check

through the California Law Enforcement Teletype System was negative, meaning the car had not been reported stolen or missing.

Police in Palo Alto, however, had reported Hughes and the vehicle missing a week earlier.

Police sources are quoted in the paper as saying "it could have been a computer error or an incorrect entry."

No further information was available as the court has ordered all those involved not to talk about the case, according to the Burlingame police.

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How Safe Is Data? Group Asks Car Pooling: Threat to Privacy?

By E. Drake Lundell Jr.
of the CW Staff

WASHINGTON, D.C.—The energy crisis may have some unexpected negative side effects on computerized personal data collection, particularly through the emphasis on car pooling and the ever-increasing possibility of rationing, according to the Project on Privacy and Data Collection here.

The project, which is supported by the American Civil Liberties Union Foundation, warned that "government and private carpool selection systems insist on using an individual's Social Security Number, although an entirely different number would serve just as well."

This increases the use of the Social Security Number as a universal identifier, the project said, at a time when many organizations are recommending that such use of the number be limited.

Who Knows the Evil...?

A far more serious problem, according to the project, involves the protection of the data stored in such carpool systems—an area that has not been explored deeply in the past.

The group noted that such computerized systems often contain a file of the hours an in-

dividual is away from home, in addition to his address and telephone number—information that many a potential thief would find interesting.

Other sources have noted that in some cases organizations are asking potential car poolers for a list of hobbies and interests, which may be fine in order to establish a carpool of compatible people, but which is often better for mailing lists.

In this regard, the Department of Transportation, which has distributed the most widely used carpooling program with over 200 users to date, said it did not prohibit firms from later selling lists of people garnered through the carpool project.

It did note, however, that the program was distributed free only to those parties which were going to use it non-commercially with others having to pay \$40 for the cost of duplicating a tape.

There could also be some privacy problems raised if the government goes to strict gasoline rationing.

While at present the administration is favoring a rationing system which would take advantage of the largely computerized state files of registered drivers, no one has ruled out completely the establishment of a national

registry of drivers in order to mail rationing material.

Under the most likely system, however, authorization cards allowing a person to buy ration stamps will be prepared at the state level from the current computerized registries of vehicle operators.

However, each motorist using the ration stamps will have to sign his name and license number at the service station in order to prevent reuse of the coupons, according to the plan on the drawing boards.

"Conceivably," the group said, "individual gas use could be monitored, or compared with existing data on car size and weight or distance from home to office or used to trace an individual's travels around the country."

In addition, others have noted that the method of mailing authorization cards to an individual's home will certainly be one way to make sure individuals keep their current addresses on file with that agency.

Also, in order to prevent motorists with licenses in more than one state from receiving a double ration of gas each month, there might be an outcry for the government to set up one national data bank on drivers to prevent such duplication, some sources said.

Longshoremen Get Shipping in Shape

STATEN ISLAND, N.Y.—Impossible as it sounds, misplacement and loss of 15-ton containers moved from trucks to storage areas for overseas-bound ships does occur at Howland Hook containerport here. The result is delays in sailing, higher shipping costs and even financial loss. But help is in sight with the computerized Marine Terminal Control System (TCS).

The system, developed for Howland by Computer Identities Corp. (CIC) of Westwood, Mass., employs a truck labeling program that provides longshoremen with computer printouts showing them where containers from the trucks should be stored in the yards, and where they should be stowed on ships, according to CIC spokesman Edmund Poole.

Using a DEC PDP-11 as the CPU and a PDP-8E as a label decoder, the TCS should overcome the present problem of misrouting of trucks that enter

the yards to unload containers while keeping track of container movement around the yards, Poole said.

When a truck enters the containerport yards, scanners attached to the PDP-8E will read the retro-reflective label on the vehicle to obtain the shipping code. At this time, the truck will also be weighed.

Then the data will be transferred to the CPU and matched with data about the ship which is to receive the load. A print-out, similar to the one given to the longshoremen, will then tell the driver where to park in the yard to unload his vehicle.

Besides providing this location data to truck drivers and longshoremen, Poole pointed out that the system "will be able to provide its operators with an immediate inventory information that can be helpful in preventing thefts."

Slated for operation this summer, the TCS will work equally

as well "in reverse" as soon as the process of labeling individual containers is completed, Poole explained. "The four gantry cranes that unload ships will be equipped with scanners hooked up to the PDP-8E," he added. "When a container is being lowered to the dock, the system will sound an alarm if the container label indicates the cargo is not for that port."

The impetus for the TCS development came from the U.S. Maritime Administration. According to Maritime officials, shippers found it more economical to ship goods through Canada, which resulted in a loss of business for U.S. ports.

As a result, they sought to regain the competitive edge by making the unloading and loading operations in the U.S. more efficient. The American Export Lines volunteered to put up money for the development of the TCS, and in 1970, CIC was awarded the contract.

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Planning More Important for Small User

By Toni Wiseman

WASHINGTON, D.C. — Planning is important in any shop, but it can make or break the small center.

That was the consensus of those attending a Computer Caravan workshop on operations management in small centers here recently.

Project scheduling is the biggest problem faced by workshop leader Roy Francis, DP manager for Hess Shoes. A daily sheet simply does not provide enough information or flexibility, he said, yet with his Century 50 he can't schedule more than a couple of days in advance.

"We can't feed multiple jobs into our machine, they have to go in one at a time," he said. "And if the job machine stops, it stays stopped."

Francis described the simple scheduling sheet he devised, which schedules jobs into one of four daily time segments, with priority jobs such as warehouse polling being run whenever they are ready.

Basically, he said, jobs are scheduled two or three days in advance. As they are run, they are crossed off the sheet. Jobs not yet scheduled are written on the bottom of the sheet.

Other discussion in the workshop focused on vendor support and the extreme extent to which small centers are vendor dependent.

Small centers have to turn to their vendors for advice; Francis said, noting that he had on occasion brought in a consultant.

"Most consultants are big-shop oriented, and just can't relate to the small system," he said.

"No one can solve your problems better than you can," he said. "It's just a case of recognizing them before they become critical."

One attendee said the only way he could get good vendor support was to sign a letter of intent rather than a contract and then the vendor was "literally falling over himself to be helpful."

Francis said he had "half-heartedly" considered a mini but the

vendor dependence aspect scared him off.

Hess Shoes is in the process of converting to a System/3. One of the advantages of this, he stated, is the availability of packages already on the market.

Francis and others at the workshop also noted the benefits of belonging to user groups. "The NCR user group finally got the company to define just how long an installation had to be down before it could go to the regional center," he said. "This had never been clear before."

Simulation Helping Nasa Scientists
Solve Mystery of Venus Clouds

WASHINGTON, D.C. — Nasa researchers using computer simulation techniques have determined that the upper levels of the cloud cover of Venus consist of droplets of sulfuric acid that are more concentrated than the acid in a car battery.

The researchers, led by Dr. James B. Pollack of the Ames Research Center, compared the infrared spectrum of the cloud layer of Venus taken by a high-flying aircraft with the results of a computer simulation of the color properties of a wide variety of substances.

The observations, made from a Learjet flying at 45,000 feet, were compared with the computer-generated spectra derived from laboratory studies of various possible cloud covers such as iron chloride, water, ice, mercury, ammonium chloride and hydrosulfuric and sulfuric acids in several combinations.

All the calculated curves differed significantly from the observed curves except the one for sulfuric acid. Moreover, the peaks and valleys of the observations were best matched by sulfuric acid concentrations of 75% or larger.

The atmosphere of Venus, often called Earth's sister planet since they are similar in size, has long been a mystery to scientists.

The new observations are expected to provide Nasa with important information that can be used for the design of future spacecraft missions to the planet, such as an entry probe mission currently under consideration by the space agency. The information may also contribute to a better understanding of the formation of sulfate particles in the Earth's upper atmosphere, where sulfuric acid is found in lower concentrations.

Is Man Obsoleteing Himself?

EAST LANSING, Mich. — Man may be making himself obsolete through computerization and automation, according to Mark B. Phillips, a doctoral candidate at Michigan State University here.

In the current issue of *Summation*, published by the university's Sociological Association, Phillips said in the future we may see a society which operates not on the basis of human contribution or needs, but on a set of "optimal computer projections" implemented and enforced without social, economic or political regard for human consequences.

"What kind of society will this be? What institutions will it contain? Can man exist in such a nonhuman environment?" he asked. "These are the questions which must be answered if changes in our social structure are to be addressed with any relevance for current social planners," he said.

To take the idea of cybernation to the extreme "to which theoretical knowledge would appear to lead us" is to conclude that the coming post-industrial society will be "eventually characterized as a society in which men are almost totally dispensable," he predicted.

Who can sell Computers in Japan?

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COMPUTERWORLD

Maintenance a Chief Concern At Multivendor Installations

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. — Maintenance is emerging as a prime concern at prime multivendor installations, according to a recent Computer Caravan workshop here. "If an independent advertises plug-to-plug compatibility, isn't that what that firm should provide?" asked one user. "Why should it be the responsibility of the user to provide technical expertise to the CE to solve a problem?" was another question.

Attendees commented they had found the independent's peripheral gear to be plug-to-plug compatible, but couldn't say the same for extended core.

"If you want to design your own system, you accept the responsibility for problem determination," noted session leader Dave Whitestone of Potomac Electric Power Co. (Pepco).

Pepco's staff includes a person with responsibility for tracking down problems such as occurred with Ampex core on an IBM 360/65. The firm could have waited until one or both of the IBM and Ampex CEs reached a solution, but with neither having complete knowledge of the other's gear, it would have taken longer than Pepco wanted.

However, one user pointed out the responsibility for knowing both systems should logically belong to the independent supplier rather than the mainframe supplier or the user.

The problem of small shops procuring maintenance was of more interest to attendees than the possible occurrence of fingerprinting among service reps of many vendors.

Michael O'Heeron of Dickinson College said one reason small vendors are being almost driven to investigate multivendor situations is the lack of service they re-

ceive. He said Dickinson has an IBM 8K 1130 and it "doesn't really get much service."

Another user, G.B. Nease of Night Vision Labs, in Ft. Belvoir, Va., has an installation with an IBM 360/44 and a 4441 film reader/recorder. IBM doesn't want to maintain it, he said, adding the firm had priced annual maintenance at something like \$20,000 a year.

"We're the only one in the area and they don't want to maintain a man with that expertise," he said.

Although they have a four-hour-a-week maintenance contract, the IBM engineer comes in and calls the office and goes. "The printer is filthy," he said.

Fred Harold of the U.S. Civil Service Commission lamented the lack of service on his installation's purchased Univac 9400, which is the only 9400 in a civilian agency of the government, he said. Univac does not provide an experienced service rep for the machine, he said. Univac divides its service into segments serving civilian agencies, other government agencies and non-government.

"The 9400 is used for a training program, and since we're not a production environment," they can't understand that it is important to provide good service for it, he said.

One user cautioned the workshop that it might take some time for a third-party maintenance firm to become capable in the area of non-IBM machines.

Some problems that can arise concern who has rights to the CE manuals and the availability of parts for the CPUs, he said. All things being equal, an installation needs to be offered more than a 10% savings to go independent, advised Whitestone, but he said Pepco chose several of the independent's products on the basis of performance alone.

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Dijkstra invented it in 1965. IBM popularized it with their New York Times project in 1971. *Datanorm* made it legitimate with their cover story article in December 1973—STRUCTURED PROGRAMMING and the related concept of TOP-DOWN DESIGN have become officially recognized. Object of programming projects have demonstrated that structured programming can dramatically reduce development and testing time: one project experienced an average of only one bug per 10,000 lines of code; another project was successfully implemented with virtually no systems testing; several others have demonstrated a programmer productivity 3 to 5 times higher than normal.

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EDWARD YOURLDON is a lecturer, author and consultant in the areas of program design and on-line computer systems. He has presented over 150 seminars in structured programming, advanced programming techniques and real-time systems design in Europe, Canada, Australia and the U.S.A. His book, *Design of On-Line Computer Systems*, published by Prentice-Hall, is being used by numerous universities, and has been reviewed in *Datanorm* (Dec. 1973) and *ACM Computing Reviews* (May 1974). He is currently completing another book entitled *Advanced Programming Techniques*, and has written a number of articles for *Datanorm*, *Modern Data*, *Computers and Automation* and *IEEE*. Mr. Yourldon developed the PAL-III assembler for the PDP-8 at DEC, and has also held senior technical and management positions at General Electric and ELI Computer Time-Sharing. His practical experience with structured programming includes the design of a large payroll system for a major government agency in Australia, as well as a number of systems programming projects. Mr. Yourldon has a B.S. in mathematics from MIT, and has taught graduate-level courses at UCLA and RPI.

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Editorials

Eyeball Pollution

Optical character recognition (OCR) is in another upturn. How much new interest is due to increasing experience, how much to the current cheapness of sophisticated logic, and how much to the pressure of new applications is a matter for conjecture.

What is clear is that for consumer-oriented applications (POS, utility billing, bank checks and the like) we can and should abandon the ugly and unnecessary character shapes of OCR-A and Micr, and other less-standard distorted fonts. International development of the reasonably attractive OCR-B has provided the necessary alternative, and incorporation of B numerals into the universal code for source-marked grocery products merits congratulations.

And could we now, after having developed fast printers, and cheap printers, and plug-compatible printers, concentrate at least part of our attention on printers with attractive output? After all, it sells typewriters!

Grim Analogy

Maurice Wilkes, a founding father of computer science, spoke more perceptively at the Davos International Computer Symposium than he knew. Commenting on new proposals for improving programmer performance, and equating the chief programmer and the head surgeon, he drew several parallels between software and medical practitioners.

Alas! How true, how horribly true! Remember the problem you had finding a doctor? Remember how he sent you from specialist to specialist? Remember the long delays, and the waiting rooms? Remember how the medicine didn't seem to work very well? Remember the disdain the doctor expressed when you tried to tell him? And remember those horrendous bills?

Professor, you're right: a programmer is just like a doctor. Necessary — but what a pain in the pocket!



Letters to the Editor

Stress on Simulation Problem of CDP Exam

I recently appeared for the CDP exam and here are some comments on the "Systems Analysis and Design" section of the exam.

The area of computer simulation and Scott was excessively emphasized. It seemed just about every fifth question was

on computer simulation. It seems to me that although computer simulation is an important tool, it is extremely expensive and hence is recommended only in those situations where all other tools of systems design are unsatisfactory or unsuited. I am quite sure a survey of business systems analysis would show that not even 5% of them have ever used computer simulation. The completely random order in which the questions are arranged leaves a lot to be desired. After reading the question, one has to guess what particular area of systems analysis and design they are talking about before selecting the proper answer.

As an example, a question on time-sharing may be followed by one on communication with the user, then one on equipment selection then feasibility study then multiprogramming, simulation, then back to the area of user communication. An analyst communicates with the user at different stages for different reasons. When answering a question on user communication, one has to guess at what stage this communication is taking place.

It seems to me that this kind of guessing game could very easily be eliminated by logical arrangement of the questions so that all the questions related to systems analysis would appear in a group followed by questions on systems design, equipment selection, program and file design, implementation, etc.

Analysts are constantly bombarded with suggestions for doing things in a logical and orderly fashion. Why should not the exam to test those analysts follow that rule?

Manohar D. Apte

Berkeley, Calif.

Alarming the Public

Dale Reistad's analysis of Rep. John R. Forbes' speech on EFTS [CW, Nov. 28] was entirely correct.

It is clear that Forbes or his researchers are confusing debit and credit cards. He is possibly also confusing credit bureau functions and EFTS switching center functions.

The industry, especially the thrift industry, is ever concerned about the consumer and would not stand for any possibility of invasion of privacy and guards against this.

Articles such as the one describing Forbes' speech [CW, Nov. 27] tend to alarm the public and legislative action then tends to overreact.

As an example, three or four years ago the consumer was supposedly concerned about the quoting or non-quoting of interest rates. This was not entirely true, but it resulted in the truth-in-lending law.

I can honestly say as a commercial banker until three months ago I never experienced a customer ever examining and questioning the complicated truth-in-lending requirements. The consumer did not receive the intended benefit from the law.

As a perfect example, the bank I worked for offered a cheaper credit card. However, when they analyzed a considerable part of their ads would deal with interest rates, terms and repayment procedures, they stopped advertising.

If responsible reporting had occurred during that time period, a workable truth-in-lending law would have been enacted. The truth-in-lending requirements would have been geared to the average consumer in terms he could understand and not in legal terms.

George R. Howley

Chicago, Ill.

Addresses Useful

In response to the letter of Susan H. Lewis [CW, Feb. 20] I wish to suggest the following: Inasmuch as Lewis expressed an interest in hearing any reasons people might have for opposing certain laws, it would have been useful to include her full address. Such a practice would be in order not only in cases such as this, but also to effect a flow of information that can only help improve our industry as a whole.

Robert Arning
511 Third Ave., 4C
New York, N.Y. 10016

A New Kind of User Group—Part V

To get started, there has to be a *pro tem* executive committee, an organizing party. Members should be large and rich, major and sophisticated users of data processing and computation, international in most cases, mutually non-competitive (that is, one oil company, one bank, one airline and so on). And there should be a key senior person on top in each organization, not a big bobby DP committee. I hope to help put together such a party, although it must be largely self-energizing.

The people involved will have natural access to considerable budgets, and will be able to assign company personnel. I'm thinking of men like Al Zipl, Leo Amaya, Jack Dixon, and their foreign equivalents like Paul Jones, Hans Walter and Reay Atkinson.

This committee would work up a prospectus, probably rather different in direction and certainly very different in style from my suggestions in these columns. Using a carefully winnowed special mailing list, plus paid publicity in general media like *Fortune* and free publicity in *Computerworld* and the rest of the trade and specialized press, it would solicit membership, both full and associate. A substantial initiation fee, intended both to guarantee seriousness and to hire a nucleus office staff, would be specified.

Parenterally, I would expect the annual membership for the "creative" period (say three years) to be \$300 to \$3,000 for associates and \$3,000 to \$30,000 for full members, based on an algorithm involving both organizational size and DP expenditure. That would give \$1 million a year from a thousand associates, \$1.5 million from two hundred full members, \$500,000 from about twenty executive committee members. In the three years, Group expenses of \$4 million (including very substantial consultant fees) and a design fee of \$3 million to \$5 million — are you listening, Seymour? — could be generated. True, it costs IBM fifty times that to design a family, but for an enormous variety of explorations to be generated later, and with fantastic internal political costs.

Along about the sixth month (end of 1974), formal incorporation, major staffing, hait-passing for 1974 and calculation of 1975 fees, and scheduling of working-party meetings could be completed. Specification of the Group machine family and contracting for detailed design would take all of 1975, and would be reported to the membership, and publicly, before the IBM announcement in the late spring of 1976.

Selection of a manufacturer and placement of systems software contracts would be in early 1977, with guarantees of at least fifty maximum systems (\$5 million or more each) and letters of intent for hundreds more making direct Group subventions unnecessary. For a Fujitsu or a Univac, anyhow; and one would also expect a real drive from wealthy houses now somewhat apart from the mainframe business: Ferranti, General Electric, Philips. Some advance payments might be needed by software outfits if they are not to be subcontractors of the hardware prime contractor.

Well, gentle readers, there it is. I gave up on technical wozziness (Amdahl, TI, Goodyear). I gave up on a really powerful international consortium (Unidata plus ICL plus Fujitsu-Mitachi). This looks like the last idea I personally will be able to generate, to avoid or mitigate the on-coming DP universe of the late seventies, and forever and ever thereafter. The world of zero efficiency, I've called it. It's a world that most *not* happen.



Herb Gross

Beware of Jagged Edges of Incomplete Contract

By Tim Christo

Subject to Computerworld

The following article about the implications of offer-and-acceptance is not intended as a guide in any specific case. Readers in doubt about such matters should seek advice from their own attorney.

It is very easy to enter into a contract, even when much important matter has never been considered. One easy way which I have seen occur in data processing perhaps illustrating the danger of getting impaled upon the jagged edges of an incomplete contract, as well as illustrating the type of items needed to flesh out any agreement before the contract is really complete.

Let us call the protagonists Simon Smart and Gordon Greedy. Simon is a hard-plugging systems analyst/part-time programmer who has just developed some fascinating software for Gordon Greedy's hardware. This new software will facilitate the use of hardware in some entirely new application areas. Gordon Greedy is a huge vendor of specialized hardware catering to specific applications. Matters opened up by Simon, waiting to get Gordon to sell Simon's software, were a business-like note to him. "I have designed some interesting software which allows your XYZ 130 CPU to open up new vistas in the widget industry inventory control applications area," it read. Then, to assure that no time was wasted, it went on to suggest a demonstration at Gordon's headquarters, and concluded, "If you find that my software performs satisfactorily, my price is \$600 and a 3% royalty on all XYZ 130s sold with my software."

The letter must have struck a responsive chord. Gordon responded by setting a date, and suggested details. This part of

the letter ran:

"(1) If the software performs satisfactorily ($\pm 0.1\%$ accuracy) on widget inventory control applications, we will pay \$600 to you.

"(2) A 3% royalty will be paid for all XYZ 130s sold utilizing the Widget Inventory Control Software Package.

"(3) You will of course provide all the necessary support and consultation neces-

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sary to ensure software compatibility.

"(4) Naturally, Gordon Greedy, Inc. will have its own personnel format the hypothetical Widget Inventory Control Problem to be used in the tests.

"Please acknowledge receipt of this letter by signing the enclosed copy in the lower left-hand corner, and returning it to the undersigned. We look forward to your reply by the end of the week. Very yours, Gordon Greedy."

Let us now consider what has happened here. Simon's letter to Greedy may be characterized as a solicitation to do business. Since it really did not have adequate detail, it likely did not act as an "offer" to enter into a contract. (An "offer" when "accepted" forms a binding contract.) Gordon's letter, on the other hand, goes into some detail concerning the subject matter of the contract and therefore likely is regarded as an offer.

If Simon signs the letter and mails it back to Gordon, he has thereby accepted the offer, and the contract exists. "A contract is an agreement between two or

more persons consisting of a promise or mutual promises, the performance of which the law in some way recognizes as a duty." (Simon on Contracts, West Publishing Co., 1965).

Thus by freely entering into an agreement, parties give up certain of their freedoms. (The law will enforce the obligations which they agree to perform.) If Simon signs the letter, what will be agreed to?

He agrees to a test, at the vendor's site, on conditions supplied by the vendor, which seems fair enough. If the test is successful (as defined by the vendor, $\pm 0.1\%$), Simon gets just what he asked for—\$600. Simon also gets something he didn't ask for—an unlimited duty without compensation to maintain the software. If Simon doesn't do that, he has breached his contract and is liable for damages.

Also, there is no guarantee that Gordon Greedy, Inc. will not duplicate in some way Simon's software (with variations, of course) and thereby sell the XYZ 130 with the same applications capability but without Simon's software. Greedy, Inc. is only obligated to pay Simon for a Royalty on XYZ 130s sold with his software, not with similar software with the same capabilities.

What then should Simon do? Obviously he should see a lawyer before he signs anything. (If the simplicity of this example strikes the reader as being unreal, I can only say that I am aware of at least one example where Simon did sign the letter without seeing a lawyer. He is now impaled upon the jagged edges of an incomplete contract.)

He should suggest a more appropriate response to Greedy's letter as follows:

"Dear Mr. Greedy, I am in receipt of your recent letter inviting me to come to Cyberneticsville for a test. I am happy

that you see the value in my software and look forward to showing you its capabilities in person.

"While I feel that we are in substantial agreement, it may be best for all parties if we defer from signing anything until we have a chance to see exactly what I can produce for you. Looking forward to meeting you next week, I remain, Very truly yours, Simon Smart."

Once Simon has gone to Cyberneticsville, and successfully demonstrated the software, the letter will once again be pushed under his nose. He then should say, "Have your lawyer call my lawyer, and we'll work out the agreement."

Some of the basic components that this agreement should cover are:

- (1) The original price to be paid.
- (2) Liability in case of system failure.
- (3) Copyright protection or agreement not to compete for a certain term.
- (4) Royalties on all XYZ 130s sold for this application (regardless of whether they use Simon's software).

(5) A stated number of hours required maximum by Simon for minimum fee, with compensation to be provided for any excess compensation for time over the maximum amount spent by Simon.

- (6) Provisions for the renewal of the contract.

(7) Term of the contract and provisions for breach by either party.

The moral of this anecdote is that for every agreement there is a corresponding obligation, an obligation which should not be taken lightly.

The author is a member of the Massachusetts and Illinois State Bar Associations, and has held positions at a education committee member of the Boston Chapter of the DPMA and associate editor of Computerworld.

2 Events in February Which Shook the DP World

Data processing has proceeded along very traditional paths for the past decade or so. The DP power structure at the start of this year looked very much like the power structure of a decade ago. In any case, however, changed all that with two events in which new, young players tried out in the big leagues for the first time—and made very impressive debuts as a result. The events following the January developments which allowed new hardware to be compatible with current software, again indicates that DP is going through a year of reorganization and realignment.

The major February developments followed close upon each other, only two days apart in the middle of the month. They also came from two similar organizations: the Computer Industry Association (CIA) and the Computer Lessors Association (CLA). The geography of the developments was also close, with a dozen blocks of each other in downtown Washington. And both concerned promises for future action rather than announcements of proven products. Both may have a direct impact upon the operations of thousands of computer sites.

The industry people upon to push a standard hardware interface that will have no immediate effect upon users, while the lessors began a software support service that allows users to get immediate support via a telephone call. This is quite a difference, so let's take the two in chronological order.

On Wednesday, Feb. 13, the game boy, Jack Biddle, a CIA executive director attending an X3 meeting as a nonvoting member, loosed the normal stream of

rhetoric about the damage being done to the user and the country because of a lack of a standard interface, and again, as has been done over the years, urged that the IBM standard be accepted as a standard. However, in the midst of the rhetoric he did something unprecedented. He said his members—15 firms with over \$1 billion in annual revenue—would provide the necessary technical support to the standards task group.

Few at the meeting who listened to Biddle were unaware of the importance and the difficulty of carrying through the promise. Standards work is often labor of love, and not much else. Getting the time off, never mind travel expenses, has often proved impossible, and individual firms with more revenue than all the CIA members put together have often been providing the needed support.

Biddle, however, gave real evidence that his members were serious. There had been an ad hoc meeting the previous week in which over a dozen CIA member firms had been represented. They had agreed to support for the interface standard. So, with this evidence, this promise, the history of the U.S.'s inability to support an IBM standard, and the fact that the CIA wiped out—and with it the U.S.'s objections to such a standard. A new player had made his appearance, and was being recognized. So much for Feb. 13.

A Lessor Problem

The events of the 15th were somewhat predictable. The lessors also are facing a vacuum of support—but this time it was support right in the computer room. IBM DOS users had lost the free handholding support they had been receiving from IBM. As a result, what some might expect happened during a move into communications—or multiprocessing, etc.—a DOS user had to pay \$37/hr just to be told he misunderstood a manual, or that the system had a known flaw in this area and that he should use a standard

patch to get around it. Even worse, he also risked expensive bills which would be hard to explain to unsympathetic management just because an operator may have made a mistake.

To answer this very real problem the lessors hired outside experts in DOS to keep up to date with flaws and the problems that do arise. (Have you ever known a conversion or a software upgrade, like undertaking multiprogramming for the first time, go through without a few questions arising?)

The team leader, Tom Steel in Richmond, Va., was also given a Wats and, and many users with systems leased from CLA members were told not to call him if they had any problems (CW, Feb. 27). The experiment was for a 90-day period, when it would be reviewed by the group. No

promises for long-term support yet—but at least an illustration of willingness and an ability at last to try to find out the cost of supporting functional operating systems.

The important thing a computer user must realize is that there are new players in the game, so that he does not have to be quite so totally reliant upon the latest marketing gimmicks, or quite so frightened of the unthought threats of non-cooperation, as has been the case since Computer Year One.

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A Busy Day at DOS Support

Serious, legitimate calls marked the first day's operation of the Computer Lessors Association's DOS Support Service. These included:

QUESTION: The Hanging Sign System. A disk system hanging once or twice a day, apparently waiting for an interrupt. It could be restarted by popping plugs, thus manually creating the interrupt. The CEs were saying, "No hardware problem—must be software."

QUESTION: Did DOS Support know of any possible software problems at both the 360 and the 370 DOS software. No IBM fix was issued for the 360, but one had been issued independently by DOS Support technicians. The fix was given over the phone.

The Base Flow was Unloaded—A use of relocatable expressions, indexed by a register in a Load instruction was producing incorrect results.

QUESTION: Did DOS Support know of any reason? Were relocatable expressions being used properly?

RESPONSE: There have been problems with base registers. Let's check your base register usage, as the use of relocatables seems to be quite in order.

RESULT: A base register some pages back had been cleared, and was still pointing to a routine, instead of to the program. Problem cleared.

QUESTION: 26.2—IBM had been asked to supply Release 26.2, but it had not arrived. Can DOS Support help?

RESULT: A copy of the full release was prepared that night and sent out the next day.

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Budget Cutting May Stem Flow Of Chemical Data

WASHINGTON, D.C. — "Inept" budget cutting by the White House and the Office of Management and Budget threatens to destroy the "dream" of instant on-line access to a memory bank of the world's published knowledge of chemical science and technology, according to Dr. Robert W. Cairns, executive director of the American Chemical Society.

"Everyone will be the loser" if the OMB decision to cut support to the National Science Foundation's Office of Information Services by 40% is allowed to stand, he said.

The cutback in this area comes not at a time of tight fiscal controls, he noted, since the NSF budget for support of research projects is up 25% in the same fiscal year 1975 budget.

The dream of an on-line data bank of published information on chemical sciences and technology was just on the threshold of reality after a decade of work, Cairns said.

Ten years ago, he said in an article in *Chemical & Engineering News*, the administration asked the American Chemical Society's Chemical Abstracts Service to develop a prototype system for chemical information transfer that could then be adapted to other scientific disciplines.

Even though recent cooperative agreements for such data banks have been established with Biosciences Information Services, the American Institute of Physics and the Engineering Index, progress may now be "crippled" by the withdrawal of government support, Cairns charged.

The government now spends almost \$20 billion yearly for science technology, Cairns noted, adding that for the lack of a few million dollars more it might not be stored or used efficiently.

The cutback in the program was taken at the request of the Office of Management and Budget, not the National Science Foundation, he said.

The dream, he said, would have been realized "but for the shallow judgment of someone in the White House's OMB who does not perceive the vital role of information flow on ongoing science and technology progress."

Variations on a Theme

SAN FRANCISCO — Here's a stolen car story that really backfired:

When a local restaurateur here reported his son's car stolen to the Hall of Justice recently, he absentmindedly gave the registration number of his own car. The routine police check via computer relayed the information that \$159 was due for unpaid traffic tickets on that automobile. The complainant was detained until a friend brought the money to pay his fines.

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SOFTWARE & SERVICES

Survey Finds Most Sites Lack It

Restart/Recovery Doubles CICS Transaction Rates

By Don Levitt
of the CW staff
HACKENSACK, N.J. — Availability of a restart/recovery capability appears to be a prerequisite for effective use of IBM's Customer Information Control System (CICS) and yet, according to a recent survey, most CICS installations do not have this capability.

Those sites with the recovery potential generally handled almost twice as many transactions per terminal per hour as those without the capability, the study showed, and the differential applied as much for the large OS users as for the DOS/Entry and DOS/Standard CICS installations.

Despite these perhaps obvious findings, 55% of all CICS users responding to the survey said they didn't have a restart/recovery capability in their operation. That pattern was reversed by one data point, however, and the majority of DOS/Standard CICS users do have recovery at their installations.

The mail survey was conducted by On-Line Software, Inc., a firm that specializes in CICS support, and the results are in the first issue of the firm's free CICS Information Interchange newsletter.

'Panda' Bares OS DASD Units Contents By Data Set, Volume or User Group

OAK BROOK, Ill. — Reports produced by Panoscopic Systems' Panda LASD analysis and management package provide an OS/360-370 installation with information about its data sets, DASD volumes and the users of the data. The new utility is not just a data set listing program, the company stressed.

Panda can be used to generate two report types: volume and user group. The Volume report analyzes the contents of 2311-, 2314- and 3330-type disk volumes. The report normally shows data sets in sequence by names, but the user may specify the sequence that suits his needs. Information about each data set in this report includes total number of tracks and extents allocated, number of tracks used, unused and available for extension.

Volume summary information includes percentages of tracks

letter. Between 12% and 15% of all CICS installations responded, a spokesman said.

The January issue of the newsletter also includes an extensive, detailed description of CICS/VS, a discussion of Cobol vs. BAL for CICS applications programs, and several other articles pertinent to effective CICS use. Most of the articles were prepared by On-Line, but contributions are both wanted and welcome, an editorial noted.

No Conclusions

On-Line refused to draw any conclusions of its own from the survey results, because "you can prove or disprove almost anything if you have enough numbers to draw from." The survey in fact drew numbers from 125 installations, and some conclusions seemed clear from the bar graphs the company plotted.

The systems got bigger, both inside and outside the computer, as users moved from DOS/Entry to Standard to OS. The small systems used an average 87.5K partition and supported 15 terminals. The Standard installation used 126.5K bytes, backing up 29 terminals. OS shops had 251.5K-byte partitions and

worked with 80 terminals, on average.

The stability of the systems, the number of the average number of system crashes per week, followed much the same pattern, rising from 1.76 (DOS/Entry) to 3.35 (DOS/Standard) to 5.19 (OS).

When On-Line asked if they were using any debugging aids, only 37% of the DOS/Entry shops said "yes," whereas 71% of the OS-based installations admitted use of such support. On average, 60% of all users reported having written a terminal Error Program and, in this case, there were only slight differences between the class of users.

Size and complexity appear to go hand-in-hand with a need to alter the system. Only one-third of all DOS/Entry users said they had modified their systems, whereas two-thirds of the OS shops had made changes in theirs.

Satisfaction with CICS was uniformly high with 83% of the DOS/Entry, 90% of the DOS/Standard and a whopping 96% of the OS shops being positive about the system. They were far less sure about converting to



DOS/Standard CICS users in general had more transactions per terminal/hr than the other users, but the differences (within each class) between users with no restart/recovery (left) and those with the capability (right) were even more definitive.

CICS/VS, and only 43% overall were ready now to commit themselves to such a move.

The second edition of the

newsletter is due shortly but a few copies of the first issue are still available, from 411 Hackensack Ave., 07601.

IBM Packages Aid CICS In Five Separate Areas

WHITE PLAINS, N.Y. — IBM has announced the availability of five separate programs to support customer Information Control System (CICS) Operations. They function under DOS, OS or VS environments, the company said.

CICS Cobol Call Interface enables the programmer to concentrate on his application logic and to access any desired CICS service through a predefined CALL statement. Otherwise, IBM noted, he might have to code an Assembler Language macro or subroutine.

CICS Simulator

The CICS 3270 Simulator uses a serial device, such as a card reader, and a printer to permit testing of application programs prior to delivery of a user's 3270 CRT display stations, or when the terminals are busy.

The simulator produces hard-copy documentation of CICS 3270 basic support maps. It can also accept sets of control statements from which it creates 3270 input data streams including all necessary control characters.

A CISC On-line Test/Debug program allows the user to work with his programs, files, CICS

control blocks and tables while CICS is operating. Intended for use with the 3270 display systems, this support lets the programmer debug his logic on-line without interrupting normal production work.

Information about the real-time status and composition of an active CICS partition can be displayed and logged selectively with the aid of the CICS Dynamic Log program.

The fifth program, a CICS Performance Analyzer, allows the user to collect and summarize selected information on resource utilization. It assists in identifying inefficient or heavily used applications for proper emphasis on improving operations.

All the programs are available now under license agreements. Monthly charges are \$195 for the Cobol Interface, \$75 for the simulator, \$80 for the on-line test/debug, \$45 for the dynamic mapper and \$65 for the performance analyzer.

All are either Field Developed Programs or Installed User Programs. As such, they have very limited maintenance support. On the other hand, the monthly charges are waived after the first 12 payments have been made.

appearing at the end of each user group are total counts of tracks allocated, used, dead and available, by device type and by user group.

VS Use OK

Panda operates under either OS/360-370 or OS/VS. The utility requires a minimum of 70K bytes of main storage.

The package costs \$1,800 and can be ordered from 1301 W. 22nd St., 60521.

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WANTLAUGH, N.Y. — Label Power from Anchor Systems, Inc. generates name-and-address labels from selected portions of all records on specially formatted tapes.

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- Second Day** **Data Communications Update**
with workshops on
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On-Line Systems and Equipment Selection
- Third Day** **Operations Management**
with workshops on
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COBOL CLINIC COUNTERPOINTS Revisited...

Improving on 'Hard-Coded'

In Cobol Clinic - Part III [CW, Jan. 9] Reginald Gates offers some excellent suggestions for improving program execution timings by avoiding subscripting. In applying the same techniques for clearing a table by a group move, rather than by a loop of subscripted individual moves, we recently saved 35% of execution time in a run.

However, the recommendation of using "hard-coded" subscripts (resolved at compile time), while better than the normal variable subscripts (resolved during execution), can be improved upon. It is just as easy to code a series of instructions with individual data names:

```
ADD A01 TO B01.
ADD A02 TO B02.
...
```

As it is to use hard-coded subscripts:

```
ADD A00 (1) TO B00 (1).
ADD A00 (2) TO B00 (2).
...
```

Addressing each field by name achieves

a 3-to-1 saving in both time and storage.

The difference is explained by the generated code. Each ADD with hard-coded subscripts in paragraph WAY3-ABS-SUB generates ZAP, AP and ZAP instructions. In the WAY4-STRAIGHT paragraph, only an AP instruction is generated for each. The compiler used in this example was IBM's version 2 Anal Cobol, but the same is true of versions 3 and 4 - Gilbert F. Curtis, president, Programart Corp.

'Propagated Move' Trick

Gates points out that by adding 144 bytes to working storage a significant decrease in the instructions required to initialize an array of packed decimal fields is effected.

Most IBM Cobol programmers will have come up against the old bugbear of zeroizing packed decimal fields and many will have dropped into the trap of moving zero to the group level, thereby erasing the sign bits and causing the program to abort.

A viable alternative for initializing packed decimal fields (up to 256 bytes) in length is to take Gates' working storage definition:

```
01 LI-3YR-TOTALS COMP-3
02 LI-YR-TOT OCCURS 38
   TIMES
   PIC S9(07)
   RECODE the same array as follows:
03 LI-3YR-TOTALS-A
04 FILL-1 PIC X(144).
05 FILL-2 REDEFINES FILL-1.
06 FOUR-BYTES PIC S9(7) COMP-3.
07 FILL-3 PIC X(144).
08 LI-3YR-TOTALS REDEFINES
   FILL-3
09 LI-YR-TOT PIC S9(7) COMP-3
   OCCURS 38 TIMES.
```

The following Procedure Division Code will zeroize the array:

```
MOVE ZERO TO FOUR-BYTES
MOVE FILL-1 TO FILL-3.
```

This, of course, is the old "propagated move" trick and will effectively "ripple" the first four bytes in the array throughout the remainder of the array.

The solution avoids the need to resolve variable subscripts. Care must be taken to ensure that the field being rippled is not shorter than the basic memory fetch of

the hardware being used - e.g., a 360 Model 30 fetches one byte per access, but Model 40 fetches two bytes. To try and ripple a single byte on a Model 40 therefore will not work.

In the case presented by Gates a four-byte field is being rippled, so this is acceptable for any machine in 360 range. The same technique can be applied in reverse:

```
MOVE FILL-3 TO FILL-2
This causes the entire array to left-shift
four bytes with the last four bytes being
blank filled (by the Cobol-generated
code). I have found this technique to be
highly effective for setting up circular
buffers (especially in on-line message-
stringing applications) as the overheads
involved in resolving variable subscripts
can be prohibitive in the real-time environment. - Peter E. C. Dashedwood,
senior applications analyst.
```

The Simplest...Method

Gates' method of clearing packed decimal accumulators within subscripted tables does have some shortcomings.

Coding and keypunching of a duplicate non subscripted table containing zeroes is rather time-consuming, and increases compile time. There is a method which cannot be disputed as being the simplest and most efficient.

Set up the table as follows:

```
01 LI-3YR-TOTALS
02 FILLER PIC S9(07) COMP-3
   VALUE ZEROS.
03 LI-YR-TOT OCCURS 38
   TIMES
   PIC S9(07) COMP-3.
```

The actual size of the table (referenced by the 01-level "LI-3YR-TOTALS") is increased by only four bytes.

The actual clearing is performed via the following move:

```
MOVE LI-3YR-TOTALS TO ACTUAL-TABLE
The total storage used for clearing the
accumulators amounts to 10 bytes (4
byte constant + 6 byte move instruction).

```

For any receiving field greater than 256 bytes, a subroutine of Cobol is required to accomplish the move. The subroutine has an overhead cost of over 550 bytes and considerable execution time. If the table contained 100 zeroes of a four-byte field, it could be defined as follows:

```
08 TABLE
09 FILLER PIC S9(7)
   COMP-3 VALUE 0.
10 ACTUAL-TABLE.
11 COUNTER OCCURS 100
   TIMES
   PIC S9(7) COMP-3
   ZERO-OUT REDEFINES
   ACTUAL-TABLE.
```

The additional cost would be a minimal amount of time to code their redefines areas and no additional storage cost. - Ken Lawrence, senior project leader, and Gary Orendorf, senior program manager.

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Carlton Chandler (left) and John Ellord,
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'Zero Net Gain in Revenue'

Bell Says Wats Needs Readjustment

By Ronald A. Frank

Of the CW staff

NEW YORK—Recent proposals by AT&T to change Wats charges are designed to adjust rates to current usage patterns, according to Bell System marketing officials.

Responding to a recent analysis of the proposed Wats changes (CW, Jan. 30), William B. Snell, marketing director at AT&T Long Lines, said the tariff filing is based on a "zero net gain in revenue" and "will readjust rates commensurate with costs."

Asked why data and other full-time Wats users would pay for a minimum call holding time of one minute, even when they complete the call faster, Snell said short holding time messages and short-call calls generally generate "a disproportionate amount of costs."

The proposed changes which would

AT&T Rebuttal

affix overtime charges on full-time Wats users are being made more in anticipation of the future rather than the present, according to Jim Chappell, product manager for Wats at Long Lines.

"Less than 5% of full-time Wats lines now in use exceed 240 hr/mo, Chappell said. The proposals to set a minimum of one minute per call and charge overtime will affect "less than 0.7% of the projected Wats revenue for 1974," if ap-



Robins Chappell Snell

proved by the FCC, Chappell revealed. Setting a "floor" of one minute could remove any incentive for data users to shorten the lengths of their calls by making their transmissions more efficient and faster. This was acknowledged as an "entirely valid point" by Wayne Robins, marketing director of data services at Long Lines, but he added that AT&T does not know how to construct a pricing scheme which avoids such "infirmities."

"Socially Wrong"

If charges are not adjusted to reflect the costs being incurred, then all users will be subsidizing the full-period data user and this would be "socially wrong," Robins said.

The ATAT officials explained the minimum time charge was necessary because of the costs required to complete (or switch) a call. In order to justify the cost of switching the call, it must be charged for one minute. If this is not done, the faster calls will not be paying their own way, they added.

With the minimum call time for full-time users, ATAT will now have to supply billing data to Wats users to verify the number of hours and/or calls per month. Asked whether this would add costs for Bell, Robins said, "We've had to have this information about the traffic patterns (in the past) so that we would know where the additional [Wats] capacity would have to be provided." He agreed this accounting of hours would add more overhead for the telephone company to the full-time Wats service.

If the new rates are approved by the FCC, according to Snell, "the very largest data user on Wats will only get a 10% increase on his total monthly bill."

The ATAT officials denied the proposed new rates were an attempt to force data users off Wats and onto other ATAT services such as private lines or the soon-to-be-tariffed Dataphone Digital Service (DDS). In most cases, users with different transmission requirements than Wats customers have.

Data-Only Service Planned by Amsat For Domestic Users

ST. LOUIS—American Satellite Corp. (ASC) will begin its domestic satellite communications service for data and other users in July of this year. Among the services to be offered by the firm will be a data-only capability tailored to overcome the transmission delay that occurs with satellite communications, according to Dennis T. Goddard, vice-president for marketing.

Speaking at an annual conference sponsored by the Communications Systems Management Association (CSMA), Goddard said data users would be able to operate at 2,400-, 4,800-, and 9,600 bit/sec.

Among the data-only service features will be selective block retransmission where only the blocks in error are retransmitted. This is said to provide "better than 90% efficiency, continuous block transmission which is said to provide "error-free throughputs of 95%," and forward error correction for high-speed data, an ASC spokesman said.

The satellite company will use a transponder on the Western Union Wesar satellite scheduled for launch in April of this year. Each transponder will be able to handle 50M bit/sec of data. ASC previously had planned to use a satellite built by Hughes Aircraft.

Appearing with Goddard on a panel which discussed the impact of the new carriers, Laurence E. Harris, vice-president of MCI, said users will soon see an "entirely new attitude" on the part of the Bell System. Recent court and regulatory decisions, Harris said, will force Bell to be more cooperative with new carriers, but users can help this trend by making their requirements known to local phone companies.

The recent speech last fall by ATAT Chairman John DeBuits which took a tough position toward the new carriers, Harris said, was probably "ill-advised" in the light of recent decisions.

Several communications consultants on the panel cited the increasing communications complexities facing the data user today. Harry Newton said there are now about eight terrestrial specialized carriers, four airborne (satellite) carriers, four hybrid (packet-switching) carriers and about 400 interconnection equipment (voice and data) firms from which the user can choose.

Echoing these sentiments, Dr. Dixon Dell suggested the users establish their specific goals first so they can talk about services in exact terms with the new carriers.

Users Detail Front-End Processor Applications

By Patrick Ward

Of the CW staff

WASHINGTON, D.C.—Front-end processors, and how they should be utilized, was a leading topic among data communications panelists at the Computer Caravan stop here.

All the panelists had had some experience in dealing with various front-end processors. This variety of models can present compatibility difficulties for users switching from one to another, noted Greg Kerr of the U.S. Department of Agriculture.

And if a user simply puts on a front end to simulate something else, he's not going to get the benefits that unit could deliver, remarked Dr. David Mills of the University of Maryland.

What About Programming?

"Should users program their own front-end processors?" a Caravan attendee asked the panelists.

If the installation's programming staff has the expertise, yes, said Daniel Milton,

vice-president of International Reservations, which has an on-line reservations network serving hotels and car rental agencies.

Mills agreed that if it's within "the capabilities of a large shop, it makes sense," but he cautioned that "programming costs for these things can easily outweigh their usefulness, especially if you're starting from scratch and are within short-time limits."

International Reservations serves about 600 hotel terminals. Most of these are on dial-up nets, but the service uses private lines on the East Coast from New York to Florida, Milton said, because poor dial-up lines, especially in Florida, necessitated use of more expensive pooled equipment on leased lines.

SSA Network

The Social Security Administration had to build a nationwide net within a 14-month time frame to handle queries, data collection and administrative messages, said Gerald G. Walker III, consultant to

the SSA. The network, which uses all non-Bell modems, was up on schedule, Walker said.

Both the SSA and International Reservations nets make extensive use of monitoring. The SSA net has technical outstations that allow quick fault isolation, Walker stated.

99% Success Rate

Audible line monitors and modems and terminals with loop-back and self-testing capabilities allow International Reservations to isolate problems to the terminal, the modem or the line 99% of the time, Milton said.

Such a commitment to monitoring is surprising, Mills commented. "It's a highly important thing to be able to pinpoint these troubles," he added.

A certain percentage of poor connections and other problems are just a fact of life that users have to deal with in their hardware and software, Milton concluded.

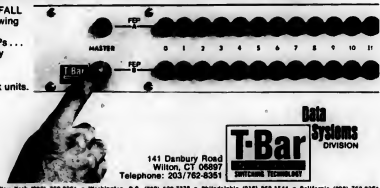
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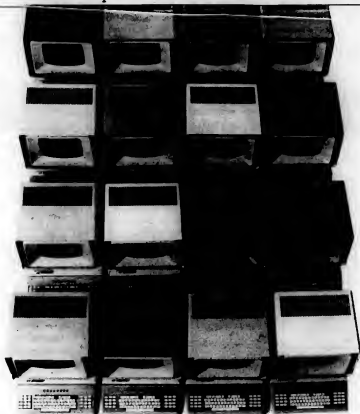
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Terminal Control Unit Temporary, But Insurance Firm Can't Let It Go

By Patrick Ward
Or use CW staff

TORONTO — Manufacturers Life Insurance Co. originally installed a Memorex 1270 terminal control unit as a temporary measure until an IBM 3705 could be delivered to corporate headquarters here.

Eighteen months later, the 1270 is still there because two evaluations found it is doing the job and saving the company over \$1,000/mo in lease costs, according to John Eddington, manager of technical support.

The Memorex 1270 is a hardwired controller equivalent to the IBM 2703, but the Memorex has features the IBM unit does not, Eddington stated.

The 1270 offers automatic code conversion, auto code recognition and automatic speed recognition.

Manufacturers Life supports non-IBM terminals that run at 300-, 600- and 1,200 bit/sec speeds and some of these

are not supported by IBM, Eddington noted.

At its headquarters here, the firm is supporting nine 60 char/sec Memorex 1240 teleprinters, five Bell Canada Vacum CRT terminals using Ascii and an Opscan document reader. All of these are local devices, but are going through the 1270 and are under its control, Eddington stated.

Most of the insurance firm's teleprocessing work is with its 46 American offices branches, plus offices in Honolulu, San Juan and London.

The bulk of transmission between the U.S. and the home office is made up of insurance policy illustrations for salesmen, Eddington said.

These are reports, used as sales aids, to help newer salesmen in writing complex insurance policies.

Personnel in the U.S. branches use Model 33 ASR TTys to send their request and data to Canada and get an overnight response over dial-up Wats lines. The terminals handle administrative work in the daytime.

Cost Comparisons

The insurance firm made two studies comparing respective costs of the 1270 and the IBM 3705 for their applications.

The first involved using the IBM Network Control Program on a 3705 on a block multiplexer channel to do what the Memorex 1270 is handling. The study indicated the need for a Model B-3 3705 with 60K of core in order to run the NCP on what the firm was doing with its 1270.

Rental cost in Canada for such a 3705 would have been \$3,868/mo, excluding modems or autocall unit, which would cost approximately \$500 more from Bell Canada, Eddington said.

A Memorex 1270 unit handling the same role would cost \$1,520/mo, he mentioned, and this would include integral modems and autocall units.

A second study six months later considered using a 3705 emulating an IBM 2703 to handle the 1270's workload. This would require a Model A-1 3705, for which rental would be \$2,244/mo plus the \$500 for necessary equipment. This was compared with a 1270 with a few more lines, costing \$1,597.

One reason for the higher price of the 3705 in the first study was that Manufacturers Life wanted to put the 3705 on the CPU's block multiplexer channel, while the Memorex controller would have gone on the byte multiplexer channel.

The insurance firm was planning to install a 370/168 in May 1974 with block multiplexer channels but no byte channels, Eddington related.

"Much to our surprise, it was cheaper to rent the 1270 on a byte channel... than it was to go with the block channel entirely and get a 3705," Eddington remarked.

Manufacturers Life will rent a byte channel on the 168 when it's installed.

(Continued on Page 19)

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Temporary Unit Remains After 18 Months

(Continued from Page 18)

By not going with the 3705, the firm came out ahead on monthly lease, and also saved about \$10,000 in conversion costs, Edgington believes.

Since the 3705 is programmable, rather than a hardwired device like the 1270, there would have to be a program produced to install it, Edgington noted, plus the overhead cost of a double rental while testing the unit, and the additional cost of maintaining programs in the future.

Manufacturers Life carefully weighed the value of an intelligent front end at its installation, Edgington said.

The firm did pinpoint four benefits that an intelligent front end would bring, but these were almost insignificant, Edgington stated.

With the 3705

If an IBM 3705 were installed, for example, it would take care of the initial contact with the terminal—in other words, the log-on or other contract, Edgington said.

If there were data checks, the 3705 "could do a little more extensive checking without interrupting the main CPU."

Also with the 3705, "we could code convert from Ascl, say to Ebclic, before sending it over the channel," Edgington noted.

And in a polling network (the firm plans to install one across Canada next year) the 3705 would take care of most of the polling overhead.

The 1270 also has autopol, but the 3705 would be more sophisticated in this regard, Edgington admitted.

3705 Savings Questionable

Manufacturers Life took a look at the projected overhead savings and was unconvinced the 3705 would be worth the extra cost, Edgington stated.

The 1270 also has autopol, but the 3705 would be more sophisticated in this regard, Edgington admitted.

Manufacturers Life took a look at the projected overhead savings and was unconvinced the 3705 would be worth the extra cost, Edgington stated.

"On our Model 155 now we run Tcam up to four hours at night transmitting and we use

five CPU seconds. If we do a cold start, we use seven. So how much are you going to save out of five CPU seconds or seven CPU seconds for an entire evening's transmission?" he asked.

The 3705 might shave one second off these times, Edgington remarked, and that would not be a very significant difference.

Excess Capacity Anyway

Furthermore, Edgington observed, "Once we install our 168 we will have excess capacity, so why do we need a front end? What is the use of pushing a workload onto a front end that

the mainframe can very ably handle?"

While he thinks the value of front-end overhead reduction can be exaggerated for many installations, Edgington conceded that for "large networks supporting hundreds of terminals" the overhead of managing the network can be significant.

In those cases, an engineering study would prove that a front end would be a good choice, he said.

But Manufacturers Life is pleased with its 1270 which has been operating since July 1972 without a single failure, Edgington said.

Now your key-to-disk system can talk to your factory foreman.

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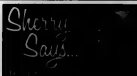
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If you have questions or orders you need file to us in our catalog, send them to: "Sherry Says" c/o International Communications Corporation 600 N. 10th Avenue Miami Florida 33142

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Harold E. O'Kelley,
President of Datapoint Corporation

Today the typical company spends more to collect and move business data than to process it. Probably you already know how to select an equipment vendor for your computer room. But how about the equally important selection of a vendor for equipment to collect and "massage" data at your field office locations and move it to and from your central computer—what we call Dispersed Data Processing.

The most critical consideration in selecting a vendor for Dispersed Data Processing equipment is the ability to support ALL your present field data collection and communication requirements, and as your business grows, to support your EXPANDED needs swiftly and economically. Much of the dispersed processing equipment currently available is impractical to upgrade without a major new investment in equipment, software and training. The wrong choice here could cost you more than your original investment, since replacing equipment at multiple field locations is more complex even than replacing a central computer.

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less transition, without the wastefulness of multiple Dispersed Data Processing vendors. No other vendor now offers such a trio of compatible processors. No other dispersed processing equipment offers as many operating advantages.

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Xebec Disk Pack Drives

Give Minis up to 80M Bytes

SUNNYVALE, Calif. — Using a five-disk pack, Xebec Systems' 7000 Series disk drives for most minicomputers give four to eight times the capacity of existing systems, according to the company.

Available in two models, the capacity per pack is either 40M or 80M bytes; rotational speed is either 2,400- or 3,600 rpm. Access time averages 30 msec with a data transfer rate of 6.5M or 9.67M bit/sec.

The price of the complete 40M-byte system is \$14,500. The 80M-byte system sells for \$16,800. The price includes the disk drive, disk formatter, coupler for the selected computer, diagnostics and complete documentation from the company at 560 San Xavier Ave., 94086.

Zipper Tape Cassette Loads 4K DG Mini in 90 Seconds

HO-HO-KUS, N.J. — Users tired of low-speed paper tape I/O on their Data General minicomputers can use Zipper, a cassette tape system for data loading or dumping.

The interface is contained on a standard-size board and connects directly to a low-cost entertainment grade cassette recorder. Zipper can load a 4K Data General 1200 in less than 90 seconds. The system includes cassette tape transport interface and software drives and is priced at \$500. Zipper is marketed by Progress Systems, 215 First St., 07423.

Microfiche Reader Uses Two Fiches

MINNEAPOLIS — The NMI-90 microfiche reader from Northwest Microfilm, Inc. provides for viewing 24X, 42X and 48X fiche through interchangeable lenses.

An optional dual-fiche carrier is automatically self-opening as the carriage is moved forward. The top glass "pop-up" for changing fiche or for removing the glass for cleaning.

The reader is priced below \$200.

Northwest Microfilm is at 6840 Shingle Creek Pkwy., 55430.

More Price Hikes Hit Users

The Peripheral Equipment Division of Pertec Corp. has raised the prices of some of its products from 3% to 5%.

The price increase, effective last week, covers some models of digital magnetic tape transports, disk drives and spare parts.

Computer Machinery Corp. (CMC) has raised its short-term lease rates and maintenance charges and is increasing its one-year lease rate by 5%.

The increases take effect March 1 for new customers and June 1 for existing users of CMC systems.

Up to 32 Stations

Univac Adds Key-to-Disk for Data Entry

By Vic Farmer

Orlando, Fla.

BLUE BELL, Pa. — Following quickly on the heels of Univac's "final answer" for keypunch lovers, the 1800s (CW, Feb. 12), Univac announced a key-to-disk system last week... or rather Univac announced a Pertec-built key-to-disk system.

The Univac 1900 Computer-Assisted Data Entry (CADE) system uses a shared processor and includes keyboards, visual displays, cartridge disk intermediate storage, with final output on 7- or 9-track magnetic tape.

The price for a basic system including 12 stations, 48K Pertec processor, cartridge disk and tape drive starts at \$1,842/mo including maintenance. More stations, up to 32, rent for \$71/mo each, all on a one-year lease.

The key-to-disk systems will be sold and serviced by Univac's Keychain Division,

and service and programming help is bundled.

The 1900 was designed and is built by Pertec Corp. for Univac which can exercise manufacturing rights if needed.

Through a check-the-right-box interactive program, the user can program the processor. The basic 48K-byte processor can be expanded to 128K bytes.

The programmable processor provides the user with dynamically allocatable memory for specific customer needs. Up to 32 program levels of control are available.

The 9-inch CRT display is formatted into 12 lines, each with 40 characters. The top two lines are used for job status, such as current position on the record, the last character which has been entered, or the program level being utilized. The bottom nine lines display information when desired, as it is keyed by the opera-

tor. The CADE system includes the typical key-to-disk bells and whistles which provide checks for detecting operator keying errors as well as data validity checks.

The keystations can be located up to 6,000 feet from the processor. The disk system, in addition to holding keyed data, contains the operating software and a library of job formats which are available for any station to control data entry during the entry, verify, search or update mode.

One disk unit contains 2.2M bytes of storage. Larger configurations can contain up to four single- or dual-platter systems to provide 17.6M bytes.

Information can be output on the tape in many codes or formats, according to the program, and expanded versions can use up to four of the tape subsystems.

Initial deliveries are planned for June.

Cambridge Memories Accelerates 370/155 CPU

CONCORD, Mass. — With the Cambridge Memories Inc. accelerator, a user of a 370/155 CPU can attain a speed increase making it comparable to a 370/158 processor when operating in a direct mode, according to the company.

The accelerator, priced at \$55,000 purchase only, is an option to a minimum of \$12K bytes of the company's 370/155 memory system. The price is \$115,000 or \$3,750/mo over a two-year lease.

Preserves Speed

The accelerator is said also to preserve the maximum processing speed of Model 155 CPUs operating with dynamic address translation (DAT) features or with very large capacity main memory.

Normally such processors suffer from speed degradation because of the increased number of CPU cycles required to fetch instructions from the buffer memory of 155 CPUs, according to the company.

When combined with the DAT feature and 2M bytes of memory, the accelerator enables users to achieve virtual storage system performance that approaches the Model 158, but at 30% less cost, the company said. The accelerator will be transparent for maintenance purposes and the user will be able to retain IBM service, the company added.

The 370/158 155 accelerator consists of high-speed control circuits that can improve the ability of a 155 CPU to fetch memory addresses from the high-speed buffer in the processor.

Improved 'Fetch Cycle'

The 8K-byte buffer, called a cache memory, is similar in both models 155 and 158, with the exception of additional memory location switches in the Model 158 which produce an improvement in

"fetch cycles" according to Cambridge. The accelerator achieves its speed improvement by providing an access method to the cache memory similar in effect to the Model 158 access method, according to the company. This access method is said to give three performance benefits:

- Better utilization of the high-speed cache memory.
- Faster instruction execution time because of the availability of addresses in the cache memory.
- Better overall processing speeds and

utilization of the main memory itself.

A 28% speed improvement results from providing 28% more CPU cycles for processing. Even higher performance can be realized in some applications, the company said.

A typical 155 user, operating in a direct processing mode, would save more than two hours of processing time a day, or the equivalent of \$100,000 annually in machine time — in addition to savings in hardware costs exceeding \$500,000 in some cases, according to the company.

Card-to-Card Changeable

Reader Allows Field Selection

CAMBRIDGE, Mass. — The DRC-202 punched card reader from Digital Laboratories offers data field selection that can be changed from card to card under program control, according to the company. This ability to select and read only

the required data can improve system speed and performance and reduce line cost transmissions for remote entry jobs, the company said.

The DRC-202 is said to be plug-compatible with most minicomputers, display terminals, printers and modems. Furthermore, the control method and command code assignments allow the unit to be used with virtually all of the currently used software systems, ranging from normal commercial time-shared and remote batch systems to programmable calculators. It has also been used with units that operate in prewired basic or natural language including the Wang 2200, the company said.

The price, complete with all the appropriate connecting cables, is \$3,850. The card mechanism handles a stack of over 400 cards at 200 card/min. When each card is read, the data is stored in a buffer so it may be retransmitted as many times as desired.

Digital Laboratories is at 377 Putnam Ave., 02139.

Disk Controller Interfaces PDP-11

SCOTTSDALE, Ariz. — The IMS300 universal fixed head disk controller is compatible with DEC's operating system software, according to International Memory Systems (IMS).

As a direct replacement for the RF11/RS11 disk systems, the IMS300 operates at half the access time and offers twice the capacity, at four times the data transfer rate, according to IMS.

The IMS300 has been successfully interfaced with a majority of the fixed-head systems currently being manufactured, they added.

Single units are priced at \$4,500 each, including self-contained power supply from the firm at 14609 North Scottsdale Road, 85254.

The 8040. Away from your MC add more IQ.

Sanders' intelligent 8040 Remote Batch Terminal System can reduce your dependence on your central computer for processing of remote-site data. A single-terminal data collection system using cassette storage, it can perform computer functions (data validation, editing, arithmetic and error-checking) at the point of data entry. It gives you source-document screen formatting and it eliminates the need for special operators. It's another reason why Sanders leads the industry in distributed data processing systems technology. Sanders Data Systems, Inc., Daniel Webster

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Roy N. Freed, a leader in this field.

Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in private practice with a prominent Boston law firm.

He has authored many articles on the various legal aspects of computers - including "Computer Frauds - A Management Trap" (Business Horizons) and a book entitled "Computers and Law - A Reference Work." Mr. Freed will personally conduct the entire seminar.

Should you attend this seminar?

If you're involved in the purchase of EDP equipment or services, the answer is a resounding "yes." Whether you're a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm, this seminar will pay for itself many times over. You just have to read the pages of Computerworld to realize how frequent supplier problems are - and how

Tesdata Monitor Uses 20 Sensors, Shows 16 Factors

MCLEAN, Va. - Tesdata Systems' Model 1020-D hardware monitor has a real-time display of 16 factors, uses 20 sensors and has a half-inch tape recorder and a report generator. When attached to a host computer system, the 1020-D electronically monitors the frequency and duration of activity taking place with a computer system and records the data on tape.

Activity is measured in operator-selected time intervals ranging from two seconds to 72 minutes. The unit samples discrete and logically associated activity 32,768 times during each interval and displays it in simple arithmetic percentage form on a display screen so the operator can visually observe system resource utilization, program execution requirements and data access patterns.

The Model 1020-D includes a write-only magnetic tape transport subsystem and control electronics for on-line recording of measurement data; the recording interval is independent of the Micro-SUM display rates. Tape transports are available in 7-track (200/55/400 bit/in.), 9-track (800 bit/in.), 9-track (1,600 bit/in.) and 9-track (800/1,600 bit/in.) units.

Also included is a real-time clock (a 24-hour time-of-day clock) with two displays maintained on the CRT display screen - time of day, updated each second; time that the display was last updated or updated each interval.

Report generator software is provided which reduces and analyzes historical measurement data recorded manually from the display screen and keypunched for input or recorded on magnetic tape. Via control cards, the user furnishes in-



Micro-SUM Model 1020-D

formation to the report generator on: data recording rate, date and start of time of measurement period, identity of processor element measurement functions - counters, specification of individual plots, summary plots and composite plots and delimiters for selective report generation. The report generator output, then, consists of four basic reports, each of them optional:

- Tabular Analysis - accumulated time for each measurement function presented in absolute form and as a percentage of the interval sampled.
- Tabular Summary - summary of accumulated time for the entire measurement period.
- Graphical Analysis - histogram of activity for each selected function monitored relative to elapsed time.
- A Graphical Composite Summary - graphic overview of system component interaction.

The Micro-SUM Model 1020-D contains arithmetic and display elements for 16 concurrent measurement functions; CRT display screen: 800 bit/in., 25 in./sec; 1/2 inch magnetic tape; 10-sensor group; logic; keyboard; generalized digital input/output interface; video output interface; and power supplies. The Model 1020-D sells for \$13,500. Tesdata Systems Corp. is at 7900 Westpark Drive, 22101.

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costly and disruptive they can be. This seminar can help you get what you want when you want it. It will help your company, your industry and you!

Times, places and cost

There are still two more seminars scheduled this spring.

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Total cost for the entire seminar, including the complete resource notebook, continental breakfasts, lunches and coffee breaks, is \$295.00. Hotel rooms, if required, are not included.

Note: Enrollment must be strictly limited, and our New York seminar was sold out. So don't wait until it's too late to enroll.

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COMPUTER INDUSTRY

CI Notes

IBM Gets Plasma Patents

TOLEDO, Ohio—Owen-Illinois, Inc. and IBM have reached an agreement giving each company a nonexclusive worldwide license for each other's patents for the manufacture of plasma panel products.

Each company will pay royalties for use of patents of the other. IBM made an initial payment of \$2 million to Owen-Illinois, half of which is creditable against future royalties.

Singer Restructures Offices

NEW YORK—Singer Business Machines is expanding its field marketing operations, restructuring its branches to handle its full line of office and system products.

The consolidation of most single-line and specialized product offices into full-line or industry branches will permit broader coverage of all Singer Business Machines marketing territories to provide customers with hardware/software solutions, according to L. C. Whitney, vice-president of Western Hemisphere marketing.

Burroughs Gets Bank Patent

LOS ANGELES—Telecredit, Inc., a check verification and loss recovery service firm, has granted Burroughs Corp. a nonexclusive license on various Telecredit patents and pending patent applications, including patent rights related to cash-dispensing machines using magnetically encoded cards.

Wango—Four-Phase Pact Set

LOS ANGELES—Wango, Inc. has received an OEM contract from Four-Phase Systems, Inc. to supply Model 8 and Model 10 digital tape drives, which will be used in conjunction with the Four-Phase Intelligent Terminal Systems. The contract is valued at more than \$3 million.

Supershorts

Boles Associates, Inc. has formed an on-site purchasing service for U.S. and European companies doing business in Japan.

Innovation Data Processing has installed its 500th program product from the Fast Dump Restore/Data Set Functions OS utility line.

Informatics, Inc. has made its first sale of Mark IV systems in an Eastern European country. The Hungarian Government is installing the systems on IBM 360/50s in the Central Statistical Offices in Budapest.

Com-Share Inc. computer services will be available in Japan through Miroku & Co., effective this fall.

Salaries Up 14%, Study Finds

Overall User Spending Should Rise 15%

By Molly Upton

of the CW staff

NEW YORK—User spending on DP should grow an average of 15% in 1974 over the 1973 figure of \$17.6 billion, reaching \$20.1 billion, according to an International Data Corp. seminar here on user spending.

Users are expected to spend about \$12.1 billion on outside expenditures, a jump of 16% over the 1973 figure, the computer industry research firm said. Internal salaries will grow to about \$8 billion, which is a 14% increase. Of that amount, 6% is considered an inflation factor.

These figures do not include EDP services bought by non-computer users or EDP software included in management consulting/CPA professional services or data entry salaries in instances of remote point of data capture such as at POS and bank terminals.

bank terminals.

The jump in expenditures from 1972 to 1973 was 14% in outside expenditures and 11% in internal salaries, the firm said. Large users, about 35% of the installed base, will increase their expenditures by between 5% to 8%.

Large firms are putting teleprocessing networks on-line, as part of a consistent, planned expansion and are alert to price/performance savings, IDC said. The medium-size installations, which account for about 55% of the installed base, will see a 12% to 18% rise in spending for 1974.

This segment is growing in internal capabilities, beginning teleprocessing, data base applications and comprises the heart of industry growth potential, IDC said.

The small user expenditures will grow by between 10% to 12% in 1974. Most of these have a single CPU at a single site

and are more dependent on supplier direction, the firm said, noting, however, that this segment tends to exhibit less customer loyalty than the larger user, who is more tied to vendor software.

Although the new user segment represents only 5% of all new equipment, it is a strategic area for firms to be in, IDC said.

As revealed by a survey of 49 sites, the significant trend of U.S. users is the integration and consolidation of computer sites. This means fewer, larger CPUs, fewer outlying medium-scale systems, more teleprocessing resources, distributed data entry and conservative staff policies, the firm said.

Salaries are the largest single item in the user budget, with 40%. EDP systems follow with 39%, then support hardware (data entry communications equipment and line costs) 10%; services, 4%; supplies, 5%; and software, 2%.

Although a small part of the overall budget, software outpaces all other sectors in its growth from 1973. Users will spend about 47% more on outside software for a total of \$352 million during 1974 compared with \$239 million in 1973, IDC predicted.

Support hardware will grow by about 25%, of which the data entry segment will account for a 14% increase. User expenditure of the support hardware category will reach \$2.1 million compared with \$1.7 million in 1973, according to the market research firm.

The third fastest growing area in terms of user expenditures is services to EDP equipment, with a 19% improvement over the 1973 figure of \$66 million, for a total of \$782 million.

IBM, in Reply to Suit, Accuses Memorex of Trade Secret Theft

By a CW Staff Writer

SAN FRANCISCO—It looks like the IBM-Memorex antitrust battle may be a repeat in many ways of the recently played out court test between IBM and Telex.

IBM, in its first response to the Memorex suit last week, not only denied all the charges contained in the Memorex suit, but also accused that firm of "an extensive and continuing course of conduct calculated to obtain IBM's trade secrets and confidential information."

IBM did not file a formal counterclaim with allegations of trade secret violations, but clearly laid the groundwork for such a claim at a later date.

In its brief to the Federal District Court here said that "Memorex conceived, implemented and enjoyed the benefits of said unlawful activity."

The Memorex action, IBM said, "included, but was not limited to, the knowing and deliberate use of confidential IBM personnel information in the conscious recruitment of IBM employees possessing or having access to such trade secrets and confidential information; the knowing and deliberate inducement of such former IBM employees to disclose trade secrets...; the knowing and deliberate solicitation, purchase and acceptance of IBM trade secrets... from industrial espionage rings and from other unlawful sources."

At the same time, IBM said it turned to long-term leasing not to stifle competition as charged, but because business was bad for IBM at the time, with salesmen only able to meet 50% of their quotas, during 1970.

This coupled with "the worst sales record" in IBM history in 1971 forced IBM

to adopt long-term leases and other measures, but the firm never cut prices below a level which would return a reasonable profit, the brief said.

Because of Memorex's alleged unlawful conduct in the trade secret area, IBM asked the court to order that Memorex take nothing from IBM, and to pay the costs of the court attorney fees.

It also said that if the court found for Memorex on any of its charges, it should order any award to Memorex by the amount that IBM was damaged through the allegedly illegal practices.

At High Federal Level

Sarnoff Wants Technology Board

BALTIMORE—In order to resolve "the current diarray in our national science and technology," RCA Chairman Robert W. Sarnoff has urged the creation of a Science and Technology Commission at the highest levels of government.

Speaking at commemoration day at Johns Hopkins University here, Sarnoff claimed that "during the past several years, the national commitment in this critical area has been seriously weakened, both financially and politically."

In the past 10 years, Sarnoff said, government spending for science and technology projects had dropped from 12% of the budget to less than 6%, while at the same time there have also been cuts in science education programs and the White House Office of the Science Advisor has been dismantled.

The new agency he proposed would be created by an act of Congress and would

be sheltered "from the shifting winds of partisan politics."

The basic objective of the commission, as viewed by Sarnoff, would be to bring the wide diversity of government activities in the scientific and technological areas into a "unified policy framework" based on the nation's long-time civilian and military needs.

"The absence of such planning and commitment has burdened us with failures and shortfalls: inadequate public transportation, polluted waters, blighted cities, and, at the moment, chilly homes and empty gas tanks," he said.

Improvised approaches won't work, he said, because the problems faced by the nation require establishment of targets and commitments that will last well beyond a single term of Congress or an administration.

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'Could Justify Many Sites,' NMA Meeting Told Paper Shortage a Boon to COM Industry

HOUSTON - The paper shortage is an opportunity for the microfilm industry, but not across the board, and long-range benefits will be derived only if the industry solves the users' problems, Charles P. Yerkes told attendees at the National Microfilm Association meeting recently.

"COM is one apparent area of

opportunity," Yerkes, vice-president, Scott Graphics, Inc., told the group.

"In the recent past we have all been introduced, sometimes rather forcefully, to the Crunch Brothers - Capacity Crunch, Materials Crunch and Price Crunch," Yerkes said.

There are two questions which the industry must ask itself, he

said: "Are we wise enough to create opportunities from such conditions?" (referring to high prices, material shortages and production limitations); and "Will we be realistic in our evaluation of both limitations and benefits of such conditions to stimulate growth and user acceptance?"

A report by Arthur D. Little, Inc. indicated that under the anticipated supply-constrained conditions, the paper industry will obtain significant price increases that will serve to allocate the supply as well as temper the demand," Yerkes said.

Yerkes cited rising prices and computer paper cutbacks as pluses for the microform/microfilm industry.

"The shortage and price of user could be increasingly important factors in the justification of many COM installations," he opined.

Reducing computer printout paper is a factor in the marketing of a COM system, he said, but it is only a "peripheral benefit."

He noted that although shortages had not yet had a drastic effect on the microfilm industry, the availability and rising prices of film (a plastic) will be a problem.

Microfilm is best suited to certain applications, Yerkes said. "We as an industry had better address ourselves to the problems of serving the complex needs of information processing."

Lockheed Buys Perdec Drivers
CHATSWORTH, Calif. - Perdec Corp., Peripheral Equipment Division, has signed a three-year contract with Lockheed Electronics for its D3000 disk drives which will be used in Lockheed's System III business computer system.

Datapoint Makes Plans For Sophisticated Users

SAN ANTONIO, Texas - Users are becoming more sophisticated, developing more DP expertise throughout the company and want to take advantage of this by doing more processing at remote sites, according to Ed Gistaro, vice-president, marketing for Datapoint Corp.

Datapoint's plan is to give the user more intelligence, flexibility and CPU power at remote sites, he added. More software is in the works for Datapoint users, he said. A key element of providing more flexibility lies in systems software, higher-level compilers and higher-level language development, he added.

Gistaro agrees with market surveys that peg the rate of growth in the intelligent terminal market between 25% and 35% a year, and noted that some companies can be expected to top the 35% rate.

There is currently enough momentum in the domestic economy to carry the rate of growth through 1974 unless "something worse than has been predicted happens," he noted.

So far, there have not been any signs of a turnaround in either the domestic or foreign markets, and

the firm is ahead of its goals in both areas, he added.

Gistaro said he expects to first see a turnaround in the international market if there's a serious recession or if the fuel shortage gets more intense.

Floppy disks will become increasingly popular on intelligent terminals, he predicted, but added he doesn't see any major inherent technological breakthrough.

Datapoint manufactures a large part of its own equipment, including the CPU, keyboard and cassette drives. "If something's that critical to you, it's risky to rely on someone else," he said.

The firm also has its own nationwide maintenance force, because "it's too critical not to have under your own control." He admitted that a maintenance force normally shows as a loss item in a rapidly growing business, but "it's an investment that I think is worthwhile. It's the name of the game to compete effectively in field service," he added.

Although Datapoint didn't make a conscious effort to penetrate specific industries, its large users lie in the railroad, banking, insurance and hospital fields.

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'Investing Heavily'

CDC Eyeing Mini Peripherals Market

MINNEAPOLIS—Pressure is coming from upper management for Control Data Corp. to get active in the area of minicomputer peripherals, according to James Burke, Washington vice-president of marketing.

"Judging from the large amount of money CDC is investing in R&D for low-cost peripherals, they must think minis are a good market," he said. This idea is borne out by the full line of peripherals CDC is offering for both OEM and end-user markets.

The company is looking at the mini printer market among others, according to John Dietrich of CDC. The firm bought exclusive marketing and manufacturing rights from LogAbax for a matrix printer marketed as the CDC 9315.

Sycor, however, markets the same printer to end users as part of its own system.

CDC, working from the philosophy that "if you

buy a mini for \$5,000 you don't want to pay \$10,000 for a printer," is marketing the 9315 for less than \$2,000, Dietrich said.

"It hits the market in the middle—between the teletypewriter and the \$4,000 drum printer," he said.

Dietrich predicted that the 9315 would be the largest selling printer this year, both OEM and end user, surpassing the 9320, of which CDC sells some 3,000 to 4,000 a year.

"We've been big in the peripherals market for the larger systems, and now we're going after this new, active mini market," Burke said, noting that minis are getting into more and more application areas.

Both Burke and Dietrich emphasized that the line of low-cost peripherals was not designed exclusively for minis, but was ideally suited to that market.

Other products in this line include the 92423 display terminal, 9226 card reader with OMR option, 92000 magnetic tape transports, 9427 cartridge disk drive and 9760 storage module drive.

CDC is also getting into the floppy disk market, they added.

Contracts

Realty Computing Corp. has signed a contract with Lockheed Electronics Co. for quantity purchase of the Lockheed System III small business minicomputer. Realty Computing will add proprietary real estate application software and market a complete turnkey system to the real estate industry.

Seaca has been awarded a contract by Fort Shafter Federal Credit Union to provide on-line data processing.

National Sharedata Corp. has received a five-year extension to its management contract with the First National Bank of Odessa, Texas.

Boeing, Honeywell and Softech have been awarded a team contract by the Air Force Avionics Laboratory (AFAL) to specify the core elements of AFAL's Digital Avionics Information System (Daia). Boeing will handle system integration, controls, multiplexing, the Daia test system, mission software and system simulation. Honeywell will develop the processor complex and digital flight control and Softech will supply the mission software architecture standards and software requirements plan.

The Kenai Native Association, a group of Eskimos, Indians and Aleuts, has awarded a \$20,000 contract to Boeing Computer Services (BCS) to develop a financial management system. BCS is training Kenai personnel to phase into management and technical areas.

Interdata, Inc. has been awarded a contract by Remote Computing Corp. for six New Series Model 50 communications processors to be used as regional message concentrators in the Automated Mortgage Management Information Network.

Centurix Corp. has received a contract from National Bankamerica for an on-line credit card system.

University Computing Corp. has been awarded a five-year data processing contract by the First National Bank of Elkhart, Ind.

GTE Sylvania, Inc. has received a \$3.4 million contract from the U.S. Army for the design, development and implementation of a DP system.

Cybergraphics, Inc. has received a contract from the Dallas Morning News for a custom-designed mailroom system.



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**COMPUTERWORLD**

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

DOD Accused of Thwarting Greater U.S.-Soviet Trade

By E. Drake Lundell
of the CW staff

WASHINGTON, D.C. — Increased trade between the U.S. and the USSR in such high technology items as computer equipment may be thwarted by the Department of Defense, according to the Russian Communist Party newspaper *Pravda*.

And those charges are somewhat substantiated by people close to file discussions here regarding the relaxation of trade restrictions with the Eastern Bloc, who noted the Defense Department is the strongest supporter of keeping the restrictions in place.

Officially, however, the Defense Department's attitude is one of supporting increased trade with the Soviet Union, while at the same time warning the U.S. not to give too much advanced technology to the Soviets that could be used militarily.

All this may mean is that while the market for U.S. exports of such equipment to the USSR may grow dramatically from its very small current base, the equipment involved in the exports will be of relatively old vintage by U.S. standards — 360s instead of 370s, for example.

The *Pravda* article accused the Defense Department of meddling in the trade pacts the Soviets have been trying to make with U.S. firms and hinted broadly that the Soviets might be forced to look elsewhere for trading partners.

While the story did not specifically mention computer equipment, it did take note of the recent deal between the USSR and Control Data Corp. in which Data has said it has not received any pressure from the Defense Department to call off the deal that could be worth up to \$500 million over the next 10 years.

The article said the defense establishment in this country had been warning businessmen, especially those who might be in a position to sell technological processes and goods to the USSR, that trade with the Soviets could endanger national security.

The article stated the Defense Department was carrying out this strategy to sabotage the current round of Soviet-American détente, thus justifying higher defense spending.

In addition, *Pravda* said Defense officials were also trying to convince American businessmen that trade with the Soviet Union would be unprofitable.

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Three Peripherals Firms Boost Earnings, Revenues

Three peripherals firms—Calcomp, Potter and Data Products Corp.—have reported increased revenues and earnings during recent financial periods.

California Computer Products, Inc. is past the halfway mark in its quest for annual revenues of \$100 million, with six-month sales of \$57 million, a 70% rise from \$33.5 million a year ago. Earnings for the six months ended Dec. 31 totaled \$3.6 million or \$11.8 a share, including a tax credit of \$1.6 million or 53 cents a share. This compares with a loss of \$1.6 million or 55 cents a share in the same period a year ago.

Record Quarter

Second quarter results exceeded those of any other quarter, with earnings of \$2.4 million or 77 cents a share on revenues of \$31.4 million, including a \$1.1 million tax credit. In the same period last year, the firm earned \$705,000 or 25 cents a share on revenues of \$20.5 million.

Potter Instrument, Inc.'s six-month earnings jumped to \$1.6 million or 59 cents a share from \$366,524 or 13 cents a share in the same period a year ago. Revenues rose also, to \$26.6 million from \$24.3 million.

The recent earnings figures include a tax credit of \$691,305 or 25 cents a share compared with \$117,592 in the 1972 period.

In the quarter ended Dec. 31, the company recorded \$1.8 mil-

lion in income representing the excess of contractual payments received over the amounts allocated to future development work.

During the period the contractual payments totaled \$3.5 million against an agreement signed in October 1973. This, together with the improvement in European, Caribbean and domestic operations all contributed to the earnings improvement, President George W. May indicated.

May noted that production has increased substantially as parts shortages reported at the end of the first quarter were largely eliminated.

Data Products

Data Product Corp.'s third quarter results continued the record-setting pattern established in the first two periods. Earnings for the nine-month period ended Dec. 29 were 4-1/2 times those for the comparable period a year ago.

Earnings rose to \$5.6 million or 82 cents a share from \$1.2 million or 18 cents a share last year.

Revenues reached a record \$54.4 million, an increase of 30% over the \$41.8 million recorded in the year-ago period.

"In addition, the company's financial position was improved," President Graham Tyson explained. "Current ratio stands at 2.84 today compared with 1.78 this time a year ago, and overall indebtedness has been reduced."

CCI Moves to Exit Bankruptcy

CULVER CITY, Calif.—Computer Communications, Inc. (CCI) has filed a plan of arrangement leading to a discharge from bankruptcy.

The plan calls for the issuance of capital stock of the company to unsecured creditors in settlement of debts in the ratio of one share for each \$3 of debt.

Also, approximately \$2.6 million of due notes will be converted into installment obligations payable over five years. Priority claims and administrative costs will be paid in cash.

Meanwhile, the company continued to operate profitably, with its second consecutive profitable quarter.

In the second quarter ended Dec. 31, the company earned \$143,913 or 8 cents a share, including a \$75,000 tax credit. This compares with earnings of \$124,980 or 7 cents a share, including a \$54,000 special credit in the previous quarter.

Revenues for the period totaled \$1.3 million, down from \$1.6 million in the same year-ago period.

In the six months CCI posted earnings of \$245,078 or 14 cents a share on revenues of \$2.5 million. In the same period last year the firm showed a loss of \$1.5 million on revenues of \$3.2 million, including a \$1.7 million special charge. Half-year results were restated to conform to certain accounting changes.

Toward the Bottom Line

Shareholder airdrops:

IBM declared a quarterly cash dividend of \$1.28 per share of common stock, an increase of 16 cents over the former rate. The new dividend is payable March 9 to stockholders of record Feb. 13. The new rate is the maximum permissible under federal guidelines.

Burroughs also raised its quarterly dividend, to 25 cents from 20 cents, and directors proposed a two-for-one stock split subject to stockholder approval. The dividend is payable April 20 on presplit shares to holders of record March 29. And Hewlett-Packard declared a regular semiannual dividend of

10 cents a share payable April 15 to stockholders of record March 25.

\$\$\$

Datran has obtained a total of \$20 million from a Swiss investment concern, Walter Haefliger Holding AG. The money will be used for continuing construction and operations of the network.

\$\$\$

Texas Instruments reported a record backlog at year-end 1973: \$679 million. The firm also said it will continue sizable capital expenditures this year to... permit productivity improvements for long-term profitability.

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Nine Months Ended Dec 31			
Shr End	1973	1972	1971
Revenue	12,509,000	6,501,000	2,909,000
Expense	1,817,000	50,000	50,000
Earnings	2,693,000	99,000	0
a-From sale of investment and tax credit.			

DATA-CONTROL SYSTEMS			
Three Months Ended Dec 26			
Revenue	1973	1972	1971
Revenue	\$1,226,000	\$1,130,000	\$1,130,000
Expense	35,000	19,000	19,000

MILCO ELECTRONIC			
Three Months Ended Dec 31			
Shr End	1973	1972	1971
Revenue	6,969,000	4,775,000	2,704,000
Earnings	837,000	70,000	0

MSI DATA			
Three Months Ended Dec 31			
Shr End	1973	1972	1971
Revenue	5,603,167	3,600,000	2,779,000
Earnings	257,779	146,963	0
Expense	14,506,792	9,771,261	5,271,261
Earnings	793,163	376,939	0

TEXAS INSTRUMENTS			
Year Ended Dec 31			
Shr End	1973	1972	1971
Revenue	1,000,000	82,677	46,117
Earnings	1,000,000	82,677	46,117
Expense	83,235	46,117	46,117
Earnings	369,485	254,135	13,464
Earnings	742,000	369,485	13,464

CODEX			
Year Ended Sept 30			
Shr End	1973	1972	1971
Revenue	81,466	8,444	8,444
Expense	1,003,000	4,029,000	4,029,000
Earnings	1,011,000	266,000	266,000
Earnings	2,119,000	561,000	561,000
Earnings	3 Mo Shr	51	29
Earnings	2,681,000	1,337,000	1,337,000
Earnings	357,000	170,000	170,000
Earnings	742,000	369,485	13,464

CONTROL DATA			
Year Ended Dec 31			
Shr End	1973	1972	1971
Revenue	94,110,000	83,796,000	83,796,000
Expense	542,000	1,893,000	1,893,000
Earnings	60,904,000	59,792,000	59,792,000
Expense	277,929,000	209,476,000	209,476,000
Earnings	256,000	1,091,000	1,091,000
Earnings	15,238,000	15,987,000	15,987,000

RAPID DATA SYSTEM & EQUIPMENT			
Six Months Ended Dec 31			
Shr End	1973	1972	1971
Revenue	811,644,429	14,322,476	8,444
Expense	35,000	35,000	35,000
Earnings	(2,964,906)	806,725	0

HONEYWELL			
Year Ended Dec 31			
Shr End	1973	1972	1971
Revenue	85,466	84,366	84,366
Expense	2,350,992	2,125,445	2,125,445
Earnings	5,550	5,512	5,512
Earnings	10,650	82,373	82,373
Earnings	3 Mo Shr	2,30	2,30
Earnings	707,617	631,374	631,374
Earnings	2,715	2,601	2,601
Earnings	43,870	40,001	40,001

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August 5 - 10, 1974, Stockholm, Sweden

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Now it's time
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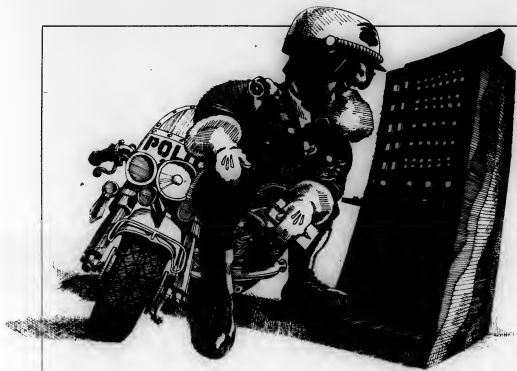
If you make your registration before April 1,
1974 you will get a substantial reduction in your
registration fee.

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P.O. Box, 5-17124 Solna, Sweden.

All statistics compiled,
completed and formatted by
TELECOMPUTES, INC.
Cambridge, Mass. 02139

Computerworld Stock Trading Summary

1973-74 CLOSE WEEK WEEK RANGE FEB 28 NET RET (1) 1974 CHNGE CHNGE						1973-74 CLOSE WEEK WEEK RANGE FEB 28 NET RET (1) 1974 CHNGE CHNGE						1973-74 CLOSE WEEK WEEK RANGE FEB 28 NET RET (1) 1974 CHNGE CHNGE																							
COMPUTER SYSTEMS												SOFTWARE & SERVICES												COMPUTER EQUIPMENT											
H. RUDOLPHSON 175-282 288 +17 7/8 +8.0												Q. ADVANCED COM TECH 1-2 1/4 +1/8 +11.1												A. COMPUTER EQUIPMENT 7-4 1/4 +3/8 +88.0											
COLLINS RADIO 15-26 34 3/4 8 +8.0												AMPLIFIED DATA PROC. 1-2 1/4 +1/8 +11.1												C. COMPUTER EQUIPMENT 7-4 1/4 +3/8 +88.0											
COMPUTER AUTONATION 4-28 13 3/4 +1 +8.0												Q. APPLIED ELECT. 1-2 1/4 +1/8 +11.1												C. COMPUTER TRANSMITTER 13-32 1/2 +5/8 +178.2											
CONTROL DATA CORP. 31-62 37 3/4 +5 +5.0												Q. ANALOG DATA PROC. 1-2 1/4 +1/8 +11.1												Q. DATA ACCESS SYSTEMS 13-32 1/2 +5/8 +178.2											
DATA GENERAL CORP. 24-49 34 1/2 +12 +12.0												Q. RANDOM APPLIED SYS. 1-5 1/8 +1/8 +16.6												Q. DATA PRODUCTS CORP. 1-19 1/4 +1/8 +16.6											
DATAPoint CORP. 18-21 13 1/4 +1/4 +1.0												Q. DATA COMM. SYSTEMS 1-2 1/4 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
DIGITAL CORP. 2-11 1/8 +10 +8.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
DIGITAL EQUIPMENT 25-17 15 7/8 +10 +8.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
ELECTRONIC ASSOC. 2-4 2 3/4 +1/8 +4.3												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
ELECTRONIC ENGINEER. 28-36 36 1/4 +8 +8.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
FORWARD 33-48 42 7/8 +28 +28.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
GENERAL AUTONATION 22-30 26 1/4 +8 +8.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
Q. GENERAL CORP. 1-1 3/4 0 0.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
HEWLETT-PACKARD CO. 87-131 127 3/4 +61 +61.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
HONEYWELL INC. 68-139 174 1/2 +88 +88.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
IBM 11-12 3 1/8 0 0.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
INTERDATA INC. 1-14 18 3/4 +7 +7.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
MINICOM DATA CORP. 22-44 37 1/2 +12 +12.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
N. NOV 27-44 37 1/2 +12 +12.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
RAYTHEON CO. 22-44 37 1/2 +12 +12.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
N. SHERIDAN 35-74 74 3/4 +172 +6.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
SPERRY RAND 36-56 41 1/2 +7 +7.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
SYSTEMS ENG. LABS. 1-1 7/8 0 0.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
TRAF. INSTRUMENTS 83-138 188 7/8 +104 +10.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
ULTRASONIC SYSTEMS INC. 2-11 1/4 0 0.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
N. VERITAS ASSOCIATES 10-20 11 1/4 +1/2 +6.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
WALL LANE 13-36 37 1/2 +10 +10.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
XEROX CORP. 188-164 115 +1/2 +212 +2.0												Q. COMPUTER COMM. 1-5 1/8 +1/8 +16.6												Q. DATA TECH. INC. 1-1/2 1/4 +1/8 +16.6											
LEASING COMPANIES												SOFTWARE & SERVICES												COMPUTER EQUIPMENT											
A. ROTHY COMPUTER 1-5 5 1/8 0 0.0												Q. INFORMATIONICS 2-7 6 3/4 8 8.0												Q. INFORMATIONICS 2-7 6 3/4 8 8.0											
COMTECH INC. 1-2 2 1/2 +1/2 +8.0												Q. I.O.A., DATA CORP. 1-1 3/4 0 0.0												Q. INFORMATIONICS 2-7 6 3/4 8 8.0											
COMTECH GROUP CORP. 1-2 2 1/2 +1/2 +8.0												Q. I.O.A., DATA CORP. 1-1 3/4 0 0.0												Q. INFORMATIONICS 2-7 6 3/4 8 8.0											
COMTECH EXCHANGE 1-2 2 1/2 +1/2 +8.0												Q. I.O.A., DATA CORP. 1-1 3/4 0 0.0												Q. INFORMATIONICS 2-7 6 3/4 8 8.0											
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